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Conference Impressions

The 51st annual conference of the Institute of British Foundrymen, held in Glasgow last week, finished with a successful trip down the Clyde and around the Kyles of Bute. In general, the weather had not been kind to the visitors, but was not allowed to interfere with the extensive social programme arranged. Before the conference started, Mr. G. Lambert was appointed secretary—a position which by long experience and undoubted aptitude he is well qualified to fill. The good wishes of the entire industry go to him, in the fulfilment of his important post. It was obvious that the financial response of the Scottish foundry industry was much greater than the needs of the conference and, wisely, John Bell Travelling Scholarships have been created from the surplus funds to enable post-graduate students to survey factories devoted to the manufacture of castings. Though these are rightly restricted to Scottish students, the whole country will benefit as the influx of foundry personnel from across the border is still quite pronounced.

The technical sessions were well patronized and probably the maximum attendance was that to hear the American exchange paper given by Mr. Dietert, of Detroit, on various methods of making castings with very close dimensional tolerances. This feature was emphasized as being a cardinal requirement in the future progress of the industry. The "aside" made by Mr. Dietert that shell-moulded steel castings lost some of this benefit through their subsequent heat-treatment is important, but we are assured by one experienced foundryman that the improvements still shown are by no means negligible. It must have been a source of satisfaction to Mr. Dietert to learn from the discussion that members of his audience were, through experience, well alive to all the implications of the newer processes and that already great progress had been made. Shell moulding returns foundry practice to very simple processing and, whilst mechanization is desirable and indeed necessary, we hope that in the race for development there will be some hesitation in the installation of steam hammers for the purpose of cracking nuts! Let work—and machinery—simplification be the keynote.

The detail work of an organization designed to take care of some 650 people for a week is a task of no mean order. Thus the unquestioned successful outcome of last week's annual conference is due to Mr. Bell himself, the Manchester office, through Mr. Lambert, Mr. A. Marshall, secretary, and Mr. D. Brown, president, respectively, of the Scottish branch, and Mr. R. R. Taylor, who headed the executive committee. To them and those who so willingly aided them in the great task, the grateful thanks of the members are due in abundant measure.

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Conference Paper Author

MR. N. B. RUTHERFORD, the Author of the Paper "Pinhole Porosity in Brass and Gunmetal Castings" printed on page 13 of this issue, was a member of the liaison department of the British Non-Ferrous Metals Research Association at the time at which the work described was carried out. Before that he was an investigator in the research department of the Association and some of his work on bronze founding during that time was published in the JOURNAL of the Institute of Metals in 1951 and 1952. He also carried out research for the Association on light-alloy founding and on hot-dip galvanizing, and in the last few years has had several papers on the latter subject published. Mr. Rutherford graduated from Manchester University in 1942, and before joining B.N.F.M.R.A. in 1947 worked as metallurgist for David Brown and Sons (Huddersfield), Limited, where his concern was with gears and machine-tools, and as metallurgist and inspector to David Brown Foundries Company, Penistone, where his duties lay with steel castings for aircraft. He is now responsible for the metallurgical side of the work of Cam Gears, Limited, makers of vehicle steering gear.

Forty Years Ago

In the issue the FOUNDRY TRADE JOURNAL for July, 1914, the Editor drew attention to the importance of carbon in cast iron, because at that time, the silicon content was regarded as being the controlling factor, *per se*, instead of a recognition of its influence on the carbon content. It was disclosed in the issue that a method of determining silicon in pig-iron was to place a sample in a tall beaker, react it with weak acid for a definite period and then measure the depth of the froth! Another simple test was used for ganister to detect whether the supplier had adulterated his product with red brick! For the rest of the contents, the issue was a rather poor vintage, except for a contribution by Mr. S. G. Smith, entitled "Suggested Plan for a General Foundry."

Latest Foundry Statistics

According to the May Bulletin of the British Iron and Steel Federation, there was a distinct decline in employment in ironfoundries during March. On April 10 there were 140,133 people employed, whereas a month earlier there were 140,744 and a year ago 144,805. The steel foundries also showed a decline and their corresponding figures read 20,092; 20,305 and 20,868. The average weekly quantity of liquid steel made during April for castings was 9,800 tons: in March, 1954, it was 10,800 and 10,600 tons in April, 1953.

The Ministry of Supply states that the production of aluminium castings during March was: sand cast. 1,875; gravity-die, 3,869; and pressure-die, 1,361 tons. Magnesium-alloy castings totalled 399 tons.

THE EXPORT of Diesel generators of 750 kW or more to the USSR was not prohibited, but it had to be kept within limits for security reasons, said Mr. D. Heathcoat Amory, Minister of State, Board of Trade.

A.D.A. Golf Tournament

The annual golf tournament of the Aluminium Development Association is an occasion on which people from more than fifty companies make or renew personal acquaintances without necessarily discussing aluminium, or even playing golf. At the Wentworth Club, Virginia Water on June 24, the ninth tournament well maintained past standards. With the foundry members of the Association acting as "hosts" there was an unusually large number shouldering responsibility for the entertainments of the day.

Golf was concerned, first, with the Horace Clarke Cup Competition, won by Mr. R. O. Bearcroft (Aluminium Union, Limited.) with Mr. S. W. Almond (Alumina Company, Limited) runner up. Mr. A. J. S. Aston (T.I. Aluminium, Limited) came third. Mr. H. Peters (Birmid Industries, Limited) won the putting competition. In the "foursomes," Mr. R. O. Bearcroft and Mr. D. A. Bompas (Aluminium Union, Limited) tied with Mr. G. Harper (Eyre Smelting Company, Limited) and Mr. W. Moulding (Almin, Limited). The president of the Association, Mr. R. T. Priestman, took the chair subsequently during dinner, at "Great Fosters," Egham. He referred to the hosts—"our foundry brethren"—and touched briefly on the value, to the aluminium industry, of its members meeting together on such occasions. Mr. E. Player (Birmid Industries, Limited), in a witty speech, made suitable response.

Magnesium Industry Council

The Magnesium Advisory Committee which was formed early in 1952 has now been reconstituted as the Magnesium Industry Council. The Council will continue the activities as a consultative and advisory body and has extended the scope through the formation of panels of technical and commercial experts. The purpose of the Council is to promote the production and use of magnesium and its alloys, which are the lightest metallic structural materials in general use to-day. The services of the Council are available to industry and to the Ministries responsible for the defence programme.

The present members are:—Aeroplane & Motor Aluminium Castings, Limited; Birmetals, Limited; Birmingham Aluminium Casting (1903) Company, Limited; James Booth & Company, Limited; High Duty Alloys, Limited; International Alloys, Limited; Kent Alloys, Limited; Magnesium Castings & Products, Limited; Magnesium Elektron, Limited; Rolls-Royce, Limited; Sterling Metals, Limited; J. Stone & Company (Charlton), Limited; Stone-Fry Magnesium, Limited; and T.I. Aluminium, Limited. The chairman is Mr. E. Player (Birmid Industries, Limited), and the secretaries, Wenham Brothers & Company, 21, Bennett's Hill, Birmingham, to whom enquiries should in the first place be addressed.

RUSTON & HORNSBY, LIMITED, and Ruston Bucyrus, Limited, engineers, Lincoln, have offered a joint loan of £10,000 for 10 years, free of interest, to Lincoln City Council, as their contribution to the cost of the Ropewalk improvement scheme. The Ropewalk is a road which leads to the access roads of the two engineering firms. The firms have stated that they hope the work on the improvement scheme will start not later than July 1, 1955. It has been reported to the committee by Mr. A. Adlington, city engineer, that negotiations for the purchase of the land are in progress, and work will start as soon as possible.

Institute of British Foundrymen

ANNUAL MEETING IN GLASGOW

The fifty-first annual general meeting of the Institute of British Foundrymen was held in the Institution of Engineers and Shipbuilders, in Scotland, Elmbank Crescent, Glasgow, on Wednesday, June 23, the president, Mr. E. Longden being in the Chair. Opening the meeting, the president said before beginning the business he thought a pause should be made to remember that they had lost their general secretary, Mr. T. Makemson. He died, as possibly most members now knew, early in the morning of June 10. Tom Makemson had been the general secretary for something like 28 years. His tenure of that position coincided with continuous and remarkable progress in the affairs of the Institute of British Foundrymen. It could well be said that he left this patch of earth the better for his having lived.

Members would also regret the passing of that well-known foundryman, Mr. D. H. Young. He was an experienced man who contributed considerably to foundry development and was well known for his sterling qualities.

On the suggestion of the president the meeting stood in silence for a short time in tribute to the members who had passed away.

Initial Business

The minutes of the annual general meeting of June 17, 1953, held in Blackpool, were taken as read and approved.

Presenting the Report of the Council* for the year 1953 to 1954, the PRESIDENT remarked that the year had been a particularly eventful one—the Report was unanimously accepted.

The president then announced that there were present at the conference distinguished representatives from foundrymen's organizations in Sweden, Norway, Belgium, the United States, Ceylon, and India.

The hon. treasurer, MR. NOEL P. NEWMAN, presented the Balance Sheet as at December 31, 1953, and the statement of accounts for the year ended December 31, 1953. As there were no questions on the accounts, MR. NEWMAN proposed their adoption. The resolution when put was carried unanimously.

Report of the Technical Council

MR. A. E. PEACE, chairman of the Technical Council, presenting the annual report of that body, said he hoped that if members had not already read the Report, they would do so.† He believed they would agree that the work was important and that during the past year the Technical Council had been exceedingly active. Many of the sub-committees had worked to completion and there would be a number of publications during next year.

It would be noticed that, initially, thanks were expressed to many organizations which had given

* Printed in last week's issue.
† See page 23 of this issue.

Delegates at one of the sessions of the I.B.F. Glasgow conference.

assistance and without whom the committees could not be nearly as effective. However, what had not been mentioned in the Report was the excellent feeling of co-operation and association that the Technical Council had with the branches. The members were represented also by elected delegates, and he would like to acknowledge the energy of the members so elected to the Technical Council. He had also to make reference to the fact that Dr. Everest, who had been his colleague for some years as deputy chairman of the Technical Council, had found it necessary to resign from that office. He would like to say how much he had appreciated his hard work and service on the committees. At the same time, he welcomed Mr. McPheat, who had taken his place.

MR. MCPHEAT, who seconded, having paid a tribute to the keenness and activity of the chairman, referred to Mr. George Lambert. Those who saw the reports going out would realize the amount of work he had to do, and it was surprising how he managed to keep a grip of the reports and their contents.

Presentation of Awards*

Oliver Stubbs Medal.—The president announced the award of the Oliver Stubbs Medal to Mr. E. M. Currie in recognition of his long and enthusiastic services to his fellow members in the practice and theory of foundrywork, and in particular for his energetic chairmanship of the technical sub-committee, T.S. 35 ("Flow of Metal"). Mr. Currie was not able to be present and the award was accepted on his behalf by Mr. J. Cameron, jnr.

E. J. Fox Medal.—The E. J. Fox Medal was awarded to Mr. Frank W. Rowe. THE PRESIDENT, making the award, said he had many recollections of Mr. Rowe dating back to his student days at the College of Technology, and he had followed his career with great interest. Mr. Rowe had been a great friend of many people in this country. The citation for the award stated that it was in recognition of his important contributions to foundry technology, particularly the technology of non-ferrous metal castings and steel castings.

Acknowledging the award, MR. ROWE said it was platitudinous for him to say that he was deeply honoured, but nevertheless it was very true. In fact, he felt some embarrassment and humble, because it made him feel conscious that there were many things more that he should have done to help forward that great and important industry. Very soon it would be 40 years since he had first started work in a foundry—he was proud to say it was alongside Mr. Longden and the late Tom Makemson whose untimely death had been so great a blow to all.

Possibly the greatest task in front was to see that the highest type of British youth was brought into the industry. It offered a career in doing a worthwhile job which was of great importance to the nation.

*See also page 21 of this issue.

Meritorious Services Medal.—Presenting the Meritorious Services Medal to Mr. W. G. Mochrie, THE PRESIDENT mentioned it was "in recognition of his distinguished services as hon. secretary of the London branch of the Institute and for his valued work in many other directions."

MR. MOCHRIE, responding, said the award had given him quite a shock, but a very pleasant one in its after effects. Why members should reward anyone for doing the things which he wanted to do defeated his comprehension, but he was very pleased that the award should have been made at that conference and in that place, because, although it might not be apparent, he was a Scot (laughter).

British Foundry Medal and Prize.—The award of the British Foundry Medal and Prize was made to Mr. D. H. Potts, and MR. BARRINGTON HOOPER, making the presentation, said he felt like the last of the ten little nigger boys in that he could remember the days when the donors of the Institute's medals made the presentations in person, and now he was the only one left who did so.

MR. POTTS, acknowledging the ward, admitted to feeling very humble in such a distinguished gathering, but he also had the feeling of satisfaction in that he had been of some small service to the industry.

Diplomas. Following the request of the chairman, the secretary announced that the Council had decided to award Diplomas to the following authors for papers presented during the year:—

Mr. E. Morgan, for his joint authorship of the paper "Investigations on Dust Problems in Foundries"—East Midlands branch. [Shortly to be printed.—EDITOR.]

Mr. D. Fleming, for "Inter-relation of Combustion and Metallurgical Reactions in the Cupola" (at the Blackpool conference).

Mr. A. Emmerson, for "Shell Moulding of Cylinder Castings" (to the London branch).

Mr. J. Langham, "Propeller Manufacture" (London Branch).

Mr. C. M. G. Wallwork, "Approach to Foundry Mechanical Handling" (Birmingham branch).

Mr. J. Burrell, "Quantity Production of Engineering Castings" (Lincolnshire branch).

Mr. J. Steele, "Thermit Casting" (South African branch).

Election of Officers

As President. Proposing that Mr. John Bell be elected president for the year 1954-55, the chairman, MR. LONGDEN, said in Mr. Bell they had a man highly esteemed in technological, educational and manufacturing spheres of foundrywork. His nomination not only gave pleasure to the Scottish branch, but to every branch in the country and to the whole of the Institute of British Foundrymen and also to people on the fringe of that organization. Mr. John Bell had had a very distinguished career and had done yeoman service for the Scottish branch as secretary for 31 years. He had always been a ready and reliable councillor on committees of the Institute and on the General Council. This reliability might be expressed by saying that

he possessed the quality of persistence and obstinate endurance, the lack of which very often led to so much inefficient work.

MR. D. BROWN, president of the Scottish branch, seconding, said it gave him real pleasure to support the chairman in this proposition. In Scotland they were naturally intensely proud of John Bell and believed he would be one of the finest presidents the Institute had ever had.

MR. BELL acknowledging his election said by making him president members had conferred on him an honour which he had thought was far beyond the bounds of remotest possibility. On that account he felt all the more grateful and thanked them sincerely for it. He also thanked Mr. Longden and Mr. Brown for the kind and generous words they had used in proposing his election and the assembly for the kind way in which they had indicated their approval. At the same time, he would use the occasion to acknowledge his indebtedness to many other people, some happily still with them, some unfortunately had passed on; some were present, while yet others he feared were completely forgotten, but all had had something or other to do in helping him in his long journey from the obscurity of a new member to the prominence of being president.

His second words would have to be words of warning; members must not expect too much from him, either that year or during any part of his term of office. He brought no academic achievement or a prominent place in the industry, but he did bring a lifetime of service in one or other of its branches —a lifetime going a long way back to the closing years of last century when, as a youth, he had stood for the first time at a patternmakers' bench.

Presenting the past-president's badge to Mr. Longden, Mr. Bell pointed out that during his year of office the Institute had been on the hill tops and they had passed through the valley of the shadow, but he hoped in looking back Mr. Longden would be glad he had been with them. They thanked him for all he had done while in office. He also asked Mr. Longden to continue in the chair to the conclusion of the meeting.

Senior Vice-president. Proposing the election of Dr. A. B. Everest as senior vice-president, Mr. A. E. Peace said he had been closely associated with Dr. Everest for 20 years or more and he could think of no one who had a better inside knowledge of the Institute and its affairs. He had been a most assiduous worker and was one of those individuals who was always so busy that he could always take on another job. He thought members would be particularly fortunate in that election if Dr. Everest, as he sincerely hoped he would, went on to the presidency the following year. They would then have the international foundry conference, and Dr. Everest was an international personality and well qualified to open that conference.

MR. V. C. FAULKNER seconded the proposition and said he and Dr. Everest had been the closest friends for many years. He was certain that when the time came he would occupy the Chair with the dignity, courage and foresight such as they had learned to expect from the Institute's presidents.

The proposition was carried by acclamation.

DR. EVEREST, responding, said he hoped in the years to come he would worthily follow his immediate predecessors. In Glasgow there was a wonderful example in the excellent programme set before members, and he felt it would require all his effort and all the support he could get if he was to follow that example worthily.

Junior vice-president.—Proposing Mr. H. J. V. Williams for the position of junior vice-president, MR. J. W. GARDOM said he always felt that the nominations for that office were a most important and serious matter. The Council was putting before members a person to hold the office of junior vice-president, and in the normal way he would be following the eminent gentlemen who had occupied the position of president. Personally, he had had the good fortune to work with John Williams for quite a time. Another important thing about John Williams was that, like the president, he was a Britisher (applause), and when his turn for office came members would be travelling to Cardiff. Mr. John Williams' uncle, Mr. Edward Williams, had always stood out in his mind as one of the best presidents the Institute had ever had. If Mr. John Williams did half as well as his uncle, he thought members would have done well in accepting him.

MR. A. S. WALL, of the South Wales and Monmouthshire branch, seconding the proposition, said—as Mr. Gardom pointed out—that Mr. Williams was a foundryman and for those who were not well acquainted with the district he would add that he was a member of a family whose connection with the foundry went back for over a century. It was, indeed, the oldest foundry family in the area. Every branch of the Institute was built around certain pillars, and the Williams' family was one of the pillars around which the South Wales and Monmouthshire branch had been built. The family still carried on. In selecting Mr. John Williams for its junior vice-president the Institute would be electing a very able man, a worthy successor to Mr. Edward Williams.

The proposition was enthusiastically adopted.

Acknowledging his election, MR. WILLIAMS said he greatly appreciated the nice things which had been said about him. Judging from the many remarks he had heard, some of the members seemed to have never heard English or Scottish spoken and found difficulty in understanding one another. None seemed to have heard Welsh; that, he hoped, would not apply to members of the Institute in the future.

Appointment of Secretary

The chairman, Mr. Longden, said at that point it was necessary to make an announcement, and he thought all would be very pleased to hear that Mr. George Lambert had been appointed general secretary of the Institute of British Foundrymen. The Council had been unanimous in their choice.

When the considerable applause with which the announcement was received had died down,

I.B.F. Annual Meeting

MR. LAMBERT said they were working to a timetable and so he had to be brief, but there were two or three things that should be said on that occasion. First he would express his appreciation of members' acceptance of the Council's decision to appoint him, he could only add he wished it had been under happier circumstances, and that he had been following Tom Makemson, full of years and in honoured retirement from the Institute. That was not to be. For the future, he had aspirations for the Institute. He had enthusiasm for its work and would do his best to ensure that his efforts were worthy of the best achieved by Tom Makemson.

Election of Auditors

On the proposition of Mr. K. J. Smithson, seconded by Mr. Delport, J. & A. Sully & Company, Parliament Mansions, Abbey Orchard Street, London, were appointed auditors for the year 1954-55.

Members of Council

The secretary announced that the ballot for vacancies on the Council had resulted in Mr. E. M. Currie, Mr. H. G. Hall, Mr. M. M. Hallett, Mr. R. L. Handley and Mr. A. E. Peace being elected.

Thanks to Retiring President

The president, MR. J. BELL, proposing a vote of thanks to the retiring president said the meeting carried his mind back to the year 1936 when he sat in the body of the hall and saw two men stand up on the platform to receive the Oliver Stubbs Medal; one was president of the Scottish branch and the other was their immediate past-president, Mr. Longden. Since then he and Mr. Longden had drawn closely together and last year he had had still better opportunities of understanding Mr. Longden. He had been a loyal foundryman in every sense of the word, for everything that a good man could do, he had done and had carried through successfully a year as president of the Institute.

DR. C. J. DADSWELL, who seconded, said that as the immediate past-president (1952-53) he still retained the privilege of being closely associated with the officials of the Institute. He had had an opportunity of seeing the very conscientious work Mr. Longden continued to give during his

Scenes at the annual conference of theInstitute of British Foundrymen.

(1) Mr. W. G. Mochrie, London branch secretary, receives the Meritorious Services Medal from Mr. E. Longden, the retiring president; (2) Mr. Mochrie in Scottish costume for piping in the haggis at the annual banquet; (3) Mr. John Bell, the new president, invests Mr. Longden with the past-president's badge, and (4) Mr. Longden inducting the new president; on his right are Mr. Bell, Dr. A. B. Everest (senior vice-president) and Mr. N. P. Newman (past-president).

year of office. He said "continued," of course, because he had been for a long time a conscientious supporter and worker for the Institute, and he carried that work to the limit during his year of office. In fact so much so that he had said to them that he thought the office of president should not go to a man who was over 50 years of age.

Replying to the vote of thanks MR. LONGDEN said it was of course needless for him to say how much he appreciated what had been said about his work in the Institute and during his year of office, but one could not be president without experiencing a feeling of pride in the Institute, pride in the esteem in which it was held by other institutions and organizations outside. As they knew, it was one of the president's duties to represent the Institute on many occasions at functions of other organizations. His year of office had been a valued privilege and an education in many respects. One became endeared to a grand organization and the more immediate contact with the affairs of the Institute compelled one to appreciate very much the work of the permanent staff. In connection and in common with many presidents, his thanks were due to the late Tom Makemson. Had he been present, he would have thanked him most heartily. Of course, he coupled with that the worthy new secretary, Mr. Lambert; he had certainly been more than a faithful assistant secretary to the Institute of British Foundrymen.

He had been pleased with his visits to the branches, and he had managed to visit every one during his year of office. When ladies had been invited, his wife had accompanied him. Besides being interesting and enjoyable, visits were sometimes very strenuous and he therefore thanked the branches warmly for their help and hospitality and especially the branch secretaries. Among the highlights of his presidency, there had been the successful jubilee celebration; the international conference in Paris; the entertaining of American visitors in London. The year had been packed with interest and work.

As his final act as chairman, Mr. Longden mentioned the sending of a telegram of greetings to the president, directors, officials and members of the American Foundrymen's Society. He also mentioned the receipt of a number of telegrams of greetings from members to the new president.

This concluded the annual general meeting.

Presidential Address

After a short interval, the president, Mr. John Bell, delivered his presidential address [printed in last week's issue].

Proposing a vote of thanks to the president for the address, MR. LONGDEN said he was sure they had all listened with great interest to Mr. Bell who had given an excellent review of the past and present with an indication of the shape of things to come.

The problem of composite training and getting a balance between theory and practice was only partly met by the present college and practical training facilities. For that the Institute appealed for further effort; that certainly was a useful theme of the presidential address. Then again there was the president's reference to defective castings. Were the founder, the moulder, the coremaker, the metallurgist the only people to make mistakes?

Finally, the president had put forward a plea for collective action by the Institute for a methodical approach to the problem of design. This idea brought to the fore the outstanding work of the Technical Council which was trying to gain more prominence for that sort of work. Whether they could impose a further amount of voluminous and long-term research on to the Technical Council was not for him to say.

MR. V. C. FAULKNER (past-president) seconding the vote of thanks said the older people had heard very many presidential addresses and nine times out of ten they had been accorded the platitude that the president had given members much food for thought. Mr. John Bell had done no such thing on that occasion; he had given members a straight, clarion call to get on with the job and produce through their own Technical Council a book which would show the designer just what he had to do. That would give to the industry an impetus such as it had never had before. It was up to the members to support the president in this. There was nothing more to be said, except to ask members to accord the vote of thanks.

THE PRESIDENT acknowledging the vote of thanks said he would let members into a secret. It had taken him a long time to make up his mind as to what he should say in his address. Then, when dozing in the corner of a railway carriage on a long journey, he had had an idea and had scribbled it out. When he had got it all in order he had handed it to another man saying he did not like it and would probably tear it up. However, he had been advised to leave it. That he had done, and he had given it to members. As soon as founders refused to accept orders when something was wrong with design, then designers would begin to listen to them and they would be on their way to achieving their proper position in industry.

Civic Reception

Before the annual meeting (reported above), the first social function of the Institute's annual conference at Glasgow was a civic reception in the City Chambers, George Square, on Tuesday evening June 22. Here, the guests were received by the Lord Provost (Baillie Thomas Kerr) and the city magistrates and their ladies, and were offered a warm welcome. Mr. E. Longden (the retiring president) and Mr. John Bell (then president-elect) expressed the pleasure it afforded all the guests to be present, and their gratitude for the warmth of the welcome exended to them. The occasion was a happy "get together" and during the evening the guests enjoyed dancing and a concert.

I.B.F. Banquet Scenes

Selection of pictures taken at the annual banquet of the Institute of British Foundrymen last week, when 650 members and guests were present.

Among those shown are:—(1) Lord and Lady Bilsland and (centre) Mr. John Bell receiving members and guests; (2) (right) Mr. G. Lambert (secretary) with (on his right) Mrs. D. Fleming; Miss Gardner and Mrs. Bashall of the Manchester office and Mr. D. Fleming; (3) Mr. and Mrs. H. J. V. Williams; (4) (right to left) Mr. and Mrs. G. M. Menzies and Mr. and Mrs. J. J. Sheehan; (5) and (6) happy faces among the dancers and cocktail parties, and (7) Mr. R. S. Bushnell (centre, standing) with Swedish guests—Mr. and Mrs. E. O. Lissell on the left and Mr. and Mrs. G. Lundholm on the right, with Mr. M. Itzel centre (seated).

Institute of British Foundrymen

Annual Banquet

About 650 members and friends of the Institute of British Foundrymen and their ladies assembled in the Central Hotel, Glasgow, on June 23, for the annual banquet. They were received by the president, Mr. John Bell, and Mrs. A. Taylor, the Rt. Hon. Lord Bilsland, M.C., D.L., LL.D. (hon. president of the Scottish reception committee) and Lady Bilsland.

THE PRESIDENT was in the chair. At an early stage he paid tribute to the late secretary of the Institute, Mr. Tom Makemson, reminding the gathering that he was so largely responsible for the progress of the Institute and for the organization of the conference up to his death recently. The assembly stood in tribute to his memory, and Mr. W. G. Mochrie (hon. secretary of the London branch) piped a Lament.

At the appropriate stage during dinner, Mr. Mochrie, wearing the tartan, piped in the haggis. Behind him were the toastmaster, and then the waiters in procession bearing their loaded trays. On reaching the Chair, piper and toastmaster were offered glasses of the traditional liquid by the president, who invited the whole assembly to join in the toast " Slange à Ava " (good health).

"The City and Corporation"

The loyal toast having been honoured, MR. E. LONGDEN, M.I.Mech.E. (immediate past-president), proposed " The City and Corporation of Glasgow." The toast, he said, must need but little commendation from him, for the assembled company must be well aware of the activities of those well-known gentlemen, some of whom were present, who served the municipal life of the City of Glasgow, giving much of their time and ability to the welfare of the citizens. They tried to match the continual march of progress and of industrial and commercial success with improved amenities and benefits for citizens. Members of the Institute and their guests at the conference had been happily entertained by the Lord Provost and the City Magistrates on the previous evening in the City Chambers, and, as they had expected, they were very warmly welcomed to that great city.

Glasgow was the commercial and industrial capital of Scotland. Its fame rested not only on its unrivalled activities in the sphere of shipbuilding, but also nowadays, and happily for the better balance of employment of labour and the economy of the country, on a variety of trades and manufactures, a large proportion of its products being exported to various parts of the world. One admired the deeply religious basis of the Scottish life, but on scanning the lists of exports one was surprised to find that there was a very large export of bottled beer, whisky and Bibles!

Another very important export was that of men, for Scotsmen were well known wherever engines throbbed and engineering abounded. On the other hand, one was also aware that Scotland imported men. For instance, it was an Englishman, from Chester, who had shown how to tame the Clyde and had made possible its development. From time to time one had heard of the rivalries of Edinburgh and Glasgow, far exceeding the old rivalries of England and Scotland or the English county rivalries in the not so good old days, or even the wars of the Scottish clans. And it was said that, if one wanted to get on in Edinburgh, one should not say that one had come from Glasgow!

It had been truly said, he continued, that man did not live by bread alone. The two capital cities of Scotland were complementary to their joint welfare and to the welfare of Scotland. Edinburgh had its grandeur, its history, its literature, but it would be quick to concede that the very heart and livelihood of Scotland centred very largely in the great city of Glasgow. In spite of its feverish and aggressive industrialization over the past half century or more it had not neglected the aesthetic spheres of life in art, culture and the emancipation of its citizens. There were also its well known technical and scientific achievements which had meant so much to modern industry, and without which our industry could not prosper in the light of the competition of to-day.

It would be easy for the present generation to criticize the absence of planning in the early life of British cities and the consequent overcrowding and congestion of activities. In the life of a nation, the industrial revolution was of comparatively recent origin. In the early industrial era—and it was born in Britain, a fact which the new world sometimes forgot—there could have been little comprehension of ultimate developments which had resulted in our present way of life and the drive for world markets which still benefited us to-day. It was an easy matter to survey the past; but it was much better to look to the future with a knowledge of the mistakes we had made.

When the people of Glasgow examined the great strides made in the organization and administration of the composite business of a living community they must feel gratitude and pride in work well done. Could one think of any other form of effort where men of ability, integrity and courage gave so much, so willingly and so effectively, as the members of the City councils? The only wealth which they received was the wealth of satisfaction in giving. One might well stop to think how much the total life of the modern Scotland rested on its industrial capital, which encompassed, along with the well known satellite industrial areas, the activities and livelihood of 25 to 30 per cent. of its people and, directly or indirectly, the very economy of Scotland. Could it be said of any other nation's capital city that so much of the nation's prosperity rested upon it?

The commercial and industrial development of Scotland, and of Glasgow in particular, was identified with the names of many eminent men. Among them, he mentioned James Watt, who was not only a scientist and inventor, but was a student in metal-

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lurgy. Nielsen, from his work in a Glasgow laboratory, had developed the application of hot blast to the blast furnace in the production of pig-iron. Many eminent men of more recent times who had been so helpful in the development of the foundry industry could also be named.

Mr. Longden urged the city and its administration to continue the excellent work to which they had set their hand, and expressed the earnest hope that the city and its people would continue to progress according to plan, to the ultimate benefit of Scotland and Great Britain.

BAILLIE DAVID M. WARDLEY (senior magistrate of the city of Glasgow), whose name was coupled with the toast, responded. It was a pleasure, he said, to hear the city of Glasgow praised as Mr. Longden had praised it. At many conferences he had attended during the last few months he had been asked by the proposers of the toast to defend the interests of Glasgow against the claims of Edinburgh. The people of Glasgow knew too well that Edinburgh was the Capital of Scotland; but, he added jocularly, the capital (with a small "c") was in Glasgow! He was happy to hear such praise, knowing that the Institute had appreciated the efforts made to ensure a happy conference.

Again, he had been interested to note the interest of the members of the Institute in their own craft, for he had felt that during the last 15 years or so the crafts seemed to have been forgotten. He would say to members of the Institute and to the representatives of all other crafts throughout the country that they should look back to what had been done in the past, that they should get down to the job to prove that in Britain we could still lead the world. Recalling that 18 years had passed since the Institute had last held its conference in Glasgow, Baillie Wardley said he hoped that Glasgow would be able to welcome the members again within a shorter period than that.

"The Institute"

THE RT. HON. LORD BILSLAND, M.C., D.L., LL.D. (hon. president of the Scottish reception committee), proposed the toast of the Institute, and said he was honoured to have been asked to do so on the occasion of the annual banquet at the fifty-first annual conference. He was proud to offer a very warm welcome to all who had come from across the border, and a special welcome to those who had come from overseas. In Glasgow, it was a matter for pride also that the conference should be held under the presidency of Mr. John Bell, who stood in very high esteem not only in the foundry industry, but also held a high place in the industrial life of Glasgow, to which he had for so long been such a devoted servant.

Although Lord Bilsland felt ill-qualified technically to address a gathering of the leaders of the foundry industry from the whole of Great Britain, he said that one needed no technical knowledge to be able to appreciate the great value of the foundry industry, its importance, and the contribution it had made and was still making to the industrial progress of Great Britain. Throughout the last 200 years or so it had made a notable contribution to the Scottish economy. It had helped in no small measure to foster and sustain the reputation of Scottish industry for enterprise and quality of craftsmanship, and it had helped to carry the good name of Scotland far afield.

It was true to say that Great Britain had given a lead to the world in the practice of iron casting. The Institute was built 51 years ago on a sound and solid foundation; it had steadily grown in strength and its membership was now 5,300. It had expanded its activities and had increased its influence both at home and abroad, and he offered congratulations on the fact that the international foundry conference would be held under the Institute's auspices in London next year.

The Institute had rightly placed emphasis on the constant search for higher technical efficiency and on training and education. No-one could read the history of its first half-century, so ably compiled by the Institute's late secretary, whose death all so greatly lamented, without being deeply impressed by the range of its activities in the constant search for better methods, better materials, better products and better working conditions. The educational movement that it had inspired and sustained had performed a great service in the training of thousands of craftsmen and in giving opportunities to many to rise to positions of responsibility.

In some branches of British industry there was not, he was afraid, the co-operation which existed in, for example, the United States of America, but that charge could not be laid at the door of the foundry industry. Indeed, he believed the industry had given a splendid example in working together, in exchanging information and experience, in making its laboratories available to carry out work for the benefit of industry as a whole and in co-operation with all appropriate research and technical organizations. Four years ago, he had had the honour to open a laboratory of the British Cast Iron Research Association. It was situated on one of the industrial estates controlled by the Scottish Council of Industrial Development, of which he was chairman.

There are two classes of expenditure on which, continued Lord Bilsland, we in this country could not afford to economize. One was in the provision of the most up-to-date plant, and the second was in pure research, fundamental research, and research applied to particular problems of industry. He feared that in both those respects we were somewhat lagging behind where we ought to be. A conference such as that of the Institute, however, providing as it did for the interchange of experience and for the presentation of authoritative papers, acted as a spur to effort. It also had another very good effect in renewing old friendships.

Coupling with the toast the name of the president, Mr. John Bell, Lord Bilsland said that as a youth Mr. Bell had equipped himself very thoroughly in the foundry industry and in all branches of mechanical engineering. He had joined the Institute 37 years ago, and since 1923 he had been the hon.

secretary of the Scottish branch and, as such, a member of the General Council. He had performed outstanding services to the industry and now occupied the position at the summit of the Institute's affairs. On behalf of all, Lord Bilsland offered him very good wishes for a most successful year of office.

President's Reply

THE PRESIDENT, responding, related a story of a man who, in the past, had asked a builder to build him a house with solid foundations, surrounded by beautiful gardens and constructed of materials without blemish; it must be the best of its kind. After the work had proceeded for about seven years, the builder had said that he would like to be relieved of his labours and had asked his employer to appoint some other man to carry on the work. However, the employer, a wise man, had said he was sorry, but he could not let the builder go; there was much work still to be done, and he had built better than he knew. Now, said the president, continuing the simile, at a time when he should be retiring from his labours, he had accepted the position of president of the Institute, allowing himself to continue for at least another year at high level to do those things which for so many years had brought him much pleasure and many good friends.

In thanking Lord Bilsland for having so graciously and so gracefully proposed the toast of the Institute, Mr. Bell paid tribute to him as president of the Scottish Council of Industrial Development, a capacity in which he had blazed the trail of Scottish industrial triumphs.

"The Guests"

DR. A. B. EVEREST (senior vice-president) proposed, with, he said, a sense of privilege, the toast of "The Guests." The annual banquet was the one occasion in the year when the members of the Institute could extend hospitality to their very many friends throughout the industry and throughout the world.

After welcoming the ladies, he referred to Baillie Wardley, and confessed that he had felt there might have been some suspicion when he had noted that the Lord Provost and the city of Glasgow were represented by the senior magistrate, but on second thoughts he had decided that there was no need for Baillie Wardley to worry about the members of the Institute; they were known to be sober and strictly honest, and they welcomed him as the representative of the Lord Provost.

Another very distinguished guest was Lord Bilsland, who, he had been informed, had done more for the rehabilitation of industry in Scotland than had anyone else. A second comment that had been made concerning Lord Bilsland's good work, and which was perhaps even more apt, was that he was one of the rocks on which the new Scotland was being built. That reference to Lord Bilsland led Dr. Everest to pay tribute to all the members of the Scottish reception committee.

It was always a pleasure to welcome visitors from overseas; there were present friends from Belgium, Ceylon, India, the Scandinavian countries and the United States of America. Mr. P. de Keyser was present as the representative of the Belgian Foundrymen's Association. Many of the members of the Institute had been privileged to attend the International Foundry congress in Belgium in 1951, which they had thoroughly enjoyed. The success of that congress was due in no small measure to Mr. de Keyser.

Visitors from Sweden were Mr. E. O. Lissell and Mr. M. Itzell. It had been a pleasure to meet Mr. Lissell on occasions when serving on international committees; and he was presenting a paper to the conference, jointly with Mr. Itzell. From the United States, the Institute welcomed Mr. H. W. Dietert. Mr. Dietert was also presenting a paper to the conference. He was a director of the American Foundrymen's Society, and his name was a household word throughout the foundry industry.

To the representatives of kindred associations at home, Dr. Everest extended fraternal greetings. He offered a warm welcome to Mr. W. Barr, president of the Institution of Metallurgists; Mr. John J. Sheehan, chairman of the Council of the British Cast Iron Research Association, and a past-president of the I.B.F.; Mr. F. Webster, president of the Foundry Trades Equipment and Supplies Association; Mr. Kenneth Marshall, director of the Joint Iron Council, who helped to direct the affairs of the industry; Mr. G. M. Menzies, vice-chairman of the British Steel Founders' Association; Mr. A. McKendrick, president of the West of Scotland Iron and Steel Institute; and Mr. W. T. Hobkirk, vice-president of the Association of Bronze and Brass Founders.

Again, the Institute was glad to welcome notable people in the educational field. Dr. D. S. Anderson, director of the Royal Technical College, Glasgow, was a welcome guest; the College was a household name throughout the engineering world. Another household name was that of Professor. A. W. Scott, who had given the conference a great deal of food for thought on the getting together of foundrymen and engineers in his Edward Williams lecture that morning.

Speaking of the guests representing the works which the members of the Institute would visit during the period of the conference, Dr. Everest said it was not always stressed sufficiently how grateful the Institute was to the firms who welcomed visits by men who wanted to see the latest developments in the foundries and other shops; there was no doubt that such visiting represented one of the important means of exchanging information which was of the very greatest value to the industry as a whole. Many of the firms who had opened their doors were long esablished and well known, and supplied castings all over the world. Mr. H Gardner, who would reply, represented Glenfield and Kennedy, Limited, a well-known firm which was more than a hundred years old and had supplied equipment for hydraulic schemes, dams and irrigation schemes throughout the civilized world.

Mr. Gardner's Reply

MR. H. GARDNER (managing director, Glenfield & Kennedy, Limited) said he was honoured indeed

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to respond to the toast for so many distinguished guests, and he expressed to Dr. Everest and to the Institute grateful thanks for the hospitality and kindness extended to them. Dr. Everest had given the guests a real cast-iron welcome, abundantly trimmed with non-ferrous material as to be almost golden, with a slight trace of nickel! The Institute's guests had been melted with kindness; and if the fluidity of his remarks were impaired, that must be due to a de-gasser which had been labelled "hospitality" and which was so kindly extended. It could in no way be attributed to his core having become misplaced or to the impermeability of his mould.

In congratulating the Institute on its great work over the past 50 years, which had greatly benefited industry as a whole, Mr. Gardner expressed indebtedness to Mr. V. C. Faulkner and Mr. S. H. Russell, both past-presidents, for their recent paper on the development of the foundry industry over that period, which was a wonderful historical record. They had truly stated that the birth of unrivalled technology had occurred at the time of the creation of the British Foundrymen's Association and its official JOURNAL. The founders of the Association (now the Institute of British Foundrymen) had built better than they knew, for without the Institute the tremendous progress of the foundry industry could not possibly have been achieved.

The Institute's guests, he continued, would like to associate themselves with all that had been said in praise of the president. Having been acquainted with him for more than 30 years, he admired his great qualities. He had done a grand job, not only for the Institute but also for Scotland, in the way in which he had maintained the characteristics of a "good pattern."

Presentation to Mrs. Longden

MR. N. P. NEWMAN, J.P. (hon. treasurer and a past-president of the Institute), made a presentation on behalf of the past-presidents as a mark of respect and gratitude to Mrs. Longden. As a past-president, he knew a little of the strain which a year of office meant, and he appreciated what a great help it was to a president to be supported in his work by his lady. He was therefore honoured to be allowed to make the presentation in appreciation of the very fine way in which she had supported her husband during the past year and to offer, on behalf of the past-presidents, their very best wishes.

(The gift was a beaten-pewter tea-service and tray.)

MRS. LONGDEN, responding, expressed to the past-presidents and the president of the Institute her sincere thanks for having made to her such a grand gift. It would always be a reminder of the hospitality and the welcome extended at the social functions of the branches of the Institute which she had visited with her husband during the two half years of 1953 and 1954. Although those branches were many miles apart, there was always the same willingness to help, the same friendliness and kindness from the folk whose living came in one way or another from the foundry industry. The sterling qualities they exhibited must surely become a vital spiritual influence not only throughout the British Isles, but everywhere where people dwelt.

Mrs. Longden also took the opportunity to thank the members of the Lancashire branch and their ladies for the support and help they had so generously given, and on behalf of the ladies at the annual banquet who had been presented with lovely flowers she conveyed thanks to the committee of the Scottish branch.

MR. A. CAMPION, F.R.I.C. (hon. vice-president of the reception committee), on behalf of the Scottish branch, made a presentation of binoculars to Mr. Bell, as a mark of their esteem and their good wishes for a happy year of office as president of the Institute. Mr. Bell, he said, had served the branch as its hon. secretary for 31 years. The members of the branch were sorry to lose his services in that capacity; he had laid its foundations and had done very much to build up its structure. They had no doubt that his year of office as president would be successful, for they knew only too well the thoroughness with which he carried out any duty, and they had every confidence that his work would reflect honour on the Institute as a whole.

The president was warmly applauded, and the assembled company drank his health, with musical honours. He expressed his gratitude and appreciation to the Scottish branch, for having honoured him on that occasion.

Post-graduate Scholarship

MR. R. R. TAYLOR (convener of the conference executive committee) then announced the establishment of a new post-graduate scholarship. In the presidential address, he said, Mr. Bell had discussed the progress of the industry over the past fifty years, but had disclaimed having made any important contribution to foundry technology. However, he had in fact made a far greater contribution than he appreciated by the way in which he had helped the young foundrymen of Scotland by his advice.

Through the munificence of the firms and other friends who had contributed so generously to the conference arrangements there was a fairly large surplus, and it had been decided to establish a post-graduate scholarship at the Royal Technical College, Glasgow. The executive committee hoped that in some small measure it would assist in furthering the technical supremacy which Britain held in the foundry world to-day.

He asked Mr. Longden, as immediate past-president of the Institute, to accept from the Scottish branch the scholarship in tribute to a man who had served the branch and the Institute most loyally and was now numbered amongst the Institute's most illustrious presidents. It would be known as the "John Bell Travelling Scholarship."

MR. LONGDEN accepted the new scholarship with pleasure, on behalf of the Council and the Institute.

Pinhole Porosity in Brass and Gunmetal Castings*

By N. B. RUTHERFORD, B.Sc., A.I.M.

Pinhole porosity which is sometimes found in brass and gunmetal castings for plumbing fittings has been traced to a form of metal/mould reaction associated with the use of wheat flour as a mould dressing or sand addition. Wheat flour is frequently used to improve the surface finish of castings which are to be polished and plated. A number of alternatives to wheat flour have been tried, and pelleted pitch incorporated in the moulding sand has been found to give a satisfactory surface finish to the castings without giving rise to pinhole porosity.

Introduction

A good surface finish is essential on castings to be used for plumbing fittings and the like, since the castings are frequently polished and then nickel/chromium plated. When a dull nickel deposit is applied, the flow of metal during the buffing of the nickel prior to chromium plating tends to obscure minor surface defects. The use of bright-nickel plating solutions nowadays, renders this buffing unnecessary and surface defects on the casting are not covered over but tend to show on the finished product. This has been a cause of a large number of rejects.

One of the most frequent forms of surface defect found on castings of this kind is pinhole porosity. It occurs generally under the skin of the casting and is revealed on polishing. Bright-nickel and chromium plating generally accentuates the pinholes. The pinholes are not usually distributed uniformly over the surface of the casting, but tend to occur in patches and are most prevalent on the cope side of the castings. Fig. 1 shows a typical example.

Industrial experience has shown that this pinhole porosity can occur in the types of leaded brasses used for plumbing fittings and also in the leaded gunmetals, although lead-free gunmetals seem free from the trouble. Pinholing is only a problem where high pouring temperatures are used, but since most castings of this type are of thin section, high pouring temperatures are inevitable in practice.

Factors Causing Pinholes

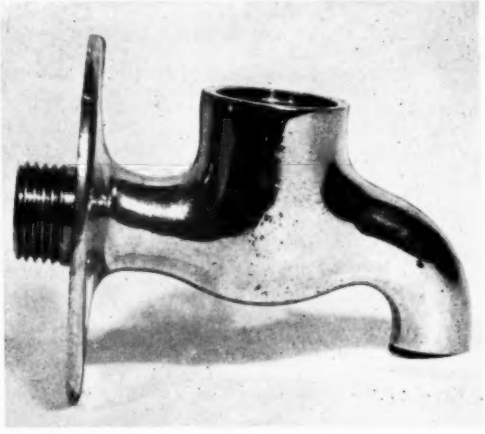
For the laboratory investigation of the factors affecting the occurrence of pinhole porosity, a strip casting 6 in. by 1½ in. by ¼ in., shown in Fig. 2 was used. The alloy used for most of the work had the nominal composition of 80 per cent. copper, 16 per cent. zinc, 1 per cent. tin and 3 per cent. lead (B.S. 1400-BIC). "Green," Mansfield-sand moulds were used throughout the work, although as noted later, mould dressings and different facing sands were used for some tests.

In the first experiments it was not possible to reproduce the pinholing found in commercial castings, although a wide range of melting and casting conditions were tried. Very high pouring temperatures were tried without success and because it was at first thought that the pinholing might be a form of "blowing" from the mould, experiments were made in which "fines" were incorporated in the moulding sand to reduce the permeability. Again, no pinholes were noticed.

Industrial foundries making plumbers' castings often use a facing sand containing a small amount of wheat flour or dust the moulds with wheat flour to improve the smoothness of the cast surface and so reduce finishing costs. A further series of experiments was therefore made for which a facing sand containing 1 per cent. wheat flour was used or alternatively the plain moulds were dusted with wheat flour. These experiments are described in what follows.

In these experiments, from each melt test-strips were cast in plain sand moulds before those cast in treated moulds to act as a yard-stick for assessing the results of the various treatments. D.T.D.-type test-bars 1 in. dia. were also cast from each melt, as a check on the gas content of the metal. One of

FIG. 1.—*Typical example of a plumbing fitting showing the characteristic pinhole defect.*



* Paper presented to the Institute of British Foundrymen at their fifty-first annual meeting. The Author, at the time of the research reported, was a member of the liaison department of the British Non-Ferrous Metals Research Association.

Pinholes in Brass and Gunmetal Castings

these bars was always cast in a mould sprayed with aluminium/magnesium paint which is an effective inhibitor against gas absorption through metal/mould reaction. The density of this bar is a measure of the gas content of the metal before casting. A second D.T.D. test-bar was cast in a plain sand mould and the density of this bar compared with that of the inhibited bar reflected the amount of gas absorption occurring through metal/mould reaction in a test-bar 1 in. dia. In the results given, densities have been converted to percentage porosity by relating them to the maximum density attainable, determined from the density of a slice cut from the maximum-density casting shown in Fig. 3, one of which was cast from each melt.

In the first experiments in which the moulds were dusted with wheat flour, pinholes were at once apparent on the strip castings when they were polished, as in preparation for electro-plating. The results of these experiments are shown in Table I, which also shows the effect of casting temperature on the occurrence of pinholes.

In Table I and subsequent Tables, the appearance of the test-strips after polishing has been visually assessed according to the following rating — this assessment refers to the cope faces of the strips. Groups I and II would be acceptable by commercial standards, but castings falling in later groups would be rejected:—

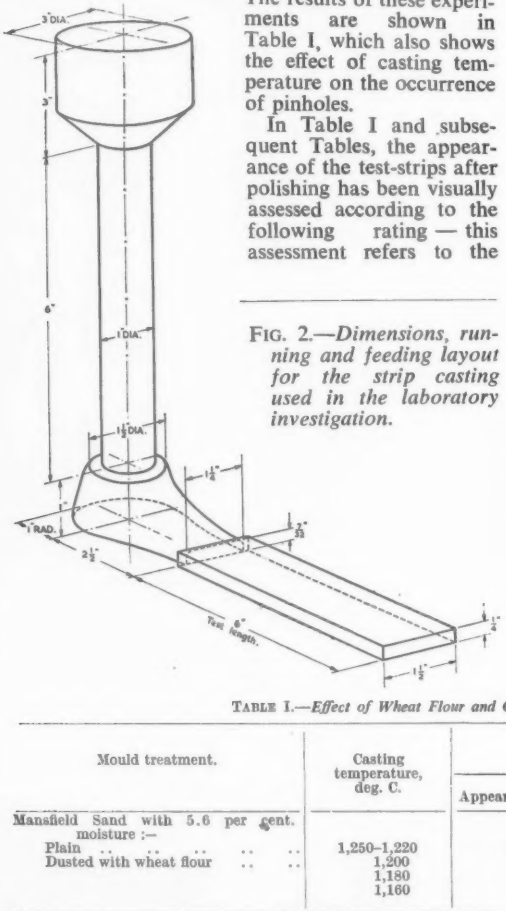


FIG. 2.—*Dimensions, running and feeding layout for the strip casting used in the laboratory investigation.*

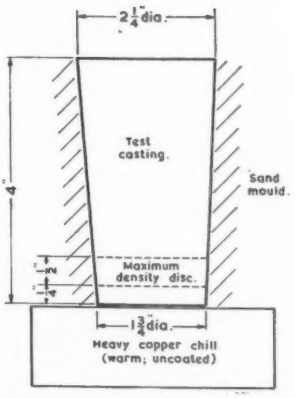


FIG. 3.—*Maximum-density casting, one of which was made from each experimental melt.*

Group.	Description.	Number of castings in group.	Porosity, per cent. Range.	Mean.
I	No pinholing ..	18*	1.0– 3.9	2.2
II	Slight pinholing ..	11	1.1– 4.9	3.1
III	Pinholing	11	2.6– 7.1	5.0
IV	Severe pinholing ..	12†	4.8– 9.6	7.0
V	Very severe pinholing	2	8.0–12.5	10.3

* Three additional castings had porosities of 5.6, 6.3 and 7.2 (see Table V footnotes).
† Two additional castings had porosities of 16.8 and 18.3 (see Table V footnote).

From a comparison of the amount of porosity in the D.T.D. test-bar cast in an unsprayed mould, and in the test-bar cast in an inhibited mould it is obvious that metal/mould reaction was producing a considerable amount of gas absorption at these high pouring temperatures, even from a plain Mansfield-sand mould and it was suspected that the pinholing noticed when wheat flour was dusted on the moulds was a more severe form of metal/mould reaction. Another series of strip castings was made in moulds faced with sand containing 1 per cent. wheat flour, some of which were sprayed with aluminium/magnesium-alloy paint to inhibit metal/mould reaction. Further tests were also made with an alloy of the same nominal composition to which was added (*a*) 0.06 per cent. phosphorus and (*b*) 1 per cent. iron

TABLE I.—*Effect of Wheat Flour and Casting Temperature on Pinhole Porosity.*

Mould treatment.	Casting temperature, deg. C.	Test strip. Appearance rating.	Test strip. Porosity, per cent.	Porosity in 1-in. dia. bars, per cent. Inhibited.	Unsprayed.
Mansfield Sand with 5.6 per cent. moisture :—					
Plain	1,250–1,220	I, II	4.9 3.8	0.1	3.9
Dusted with wheat flour	1,200	III	3.4	—	—
	1,180	III	2.6	—	—
	1,160	I	2.3	—	—

TABLE II.—*Effect of Inhibiting Moulds containing Wheat Flour:* (wheat flour in facing sand for strips only; melt G: 0.06 per cent.) phosphorus and 1 per cent. iron added.

Melt.	Pouring temperature, deg. C.	Test strips.				Porosity in bars 1 in. dia., per cent.	
		Appearance.		Porosity, per cent.			
		Unsprayed.	Inhibited.	Unsprayed.	Inhibited.	Unsprayed.	Inhibited.
F	1,250	III	II	12.1	4.9	8.7	2.2
	1,175	—	—	—	—	5.4	0.3
	1,100	—	—	—	—	0.7	0.6
G	1,250	V	II	12.5	1.0	5.6	0.5
	1,175	—	—	—	—	5.2	0.3
	1,100	—	—	—	—	1.3	0.3

plus 0.06 per cent. phosphorus, both of which are known to increase metal/mould reaction in gunmetals[1]. The results of these tests are shown in Tables II and III.

Results with Brass Castings

The results show clearly that pinhole porosity is attributable primarily to the use of wheat flour. Severe pinhole porosity was visible on the polished surfaces of all the cast strips referred to in the Tables, where wheat flour had been used either as a mould dressing or in the facing sand, even though these strips were poured after and consequently at a lower temperature than the strips in plain sand moulds which themselves showed little pinholing. The prevalence of pinholing was sensitive to casting temperature, the pinholing being slight at less than 1,160 deg. C. in the strips ¼-in. thick and increasing in severity with rise in casting temperature.

Porosity seems to arise from a form of metal/mould reaction and can be inhibited by means of aluminium/magnesium-alloy paint sprayed on the moulds; the results in Table II indicate this. The amount of porosity and the extent of the pinholing was very marked in the strips cast in moulds faced with sand containing wheat flour, but slight in the strips cast in similar moulds sprayed with aluminium/magnesium-alloy paint. The D.T.D. test-bars referred to in Table II were cast in plain sand, and the low voids in the bars cast in inhibited moulds indicate the metal to be gas-free before casting. Spraying with aluminium/magnesium-alloy paint would not, however, constitute a practical remedy for the defect in commercial production, as the surface finish obtained on the casting was insufficiently smooth.

There is an indication that the presence of iron and phosphorus together in the brass may slightly increase the metal/mould reaction, but, unlike metal/mould reaction observed in bronzes and gunmetals[1-6], the presence of phosphorus is not necessary for the occurrence of the reaction.

It may be seen from the differences in porosity between D.T.D. test-bars cast in plain and inhibited sand moulds that in a bar 1-in. dia. considerable gas absorption occurs at the high casting temperatures even in the absence of wheat flour, although wheat flour is necessary to produce sufficient gas absorption to cause pinholing in sections ¼-in. thick. Previous work[1, 2] has shown that gunmetals are much more sensitive to metal/mould reaction than zinc-free tin bronzes and it is probable that the high zinc content of the brass used in the present work, coupled with the high pouring temperatures used, is sufficient to explain the susceptibility of the alloy to metal/mould reaction.

The wheat flour intensifies the reaction—perhaps by its breakdown at high temperatures with the release of steam, subsequent reduction of this by zinc causing the release of a higher concentration of atomic hydrogen at the metal surface than that arising from mould moisture alone. Alternatively the flour might supply steam in this way for some time, controlled by its rate of decomposition, while, in comparison, mould moisture would be rapidly evaporated near the casting surface, and the time available for reaction would then be much less.

Sections taken through some of the test-strips showed that the pinholing was not confined to the surface of the castings although it was generally more concentrated towards the upper part of the casting. Figs. 4, 5, 6 and 7 illustrate this.

TABLE III.—*Effect of Iron and Phosphorus added to Brass:*
Pouring temperatures: 1,250 deg. C. (at beginning to 1,220 deg. C. at end).

Metal addition.	Mould.	Test strip.				1-in. dia. bar porosity, per cent.			
		Appearance.		Porosity, per cent.		Unsprayed.		Inhibited.	
Melt identification letter	.. ..	A	B	A	B	A	B	A	B
1 per cent. Fe and 0.06 per cent. P added	Plain, 7 per cent. moisture ..	III	II	5.2	2.5	3.2	3.1	0.6	0.5
	Dusted with wheat flour ..	IV	IV	9.4	8.0	—	—	—	—
	Faced with 1 per cent. wheat flour	III	IV	4.6	7.5	—	—	—	—
Melt identification letter	.. ..	C	D	C	D	C	D	C	D
No Fe, 0.06 per cent. P added	Plain, 7 per cent. moisture ..	II	III	4.8	6.5	3.6	3.9	0.3	0.8
	Dusted with wheat flour ..	IV	IV	6.6	6.8	—	—	—	—
	Faced with 1 per cent. wheat flour	IV	—	7.0	—	—	—	—	—

Pinholes in Brass and Gunmetal Castings

Pinholing in Gunmetals

Pinholing in gunmetals was first noticed in a foundry after changing from a metal composition of 87/9/4 Cu/Sn/Zn to 85/5/5/5 Cu/Sn/Zn/Pb and the following experiments were designed to see whether this change in alloy was responsible. Since the experiments on brass had suggested the pinholing to arise from a form of metal/mould reaction, and the phosphorus content of gunmetals was known to control the extent of the reaction in these alloys[1-2], the effect of phosphorus content on pinholing was examined in the experiments described below. The experimental method was similar to that for the brass. All melts were degassed with

FIG. 4.—*Cross-section through brass strip cast from 1,250 deg. C. into a plain sand mould;* (×10).

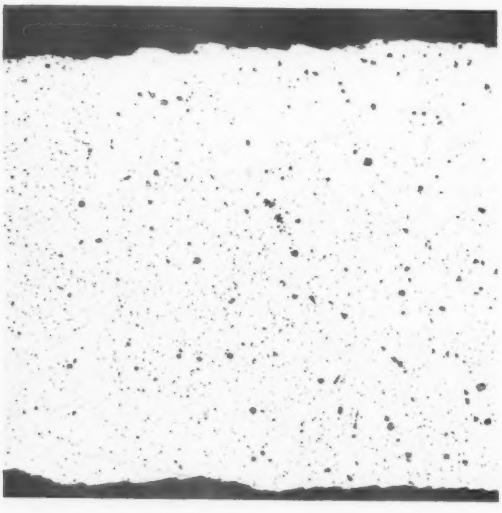


FIG. 5.—*Cross-section through brass strip cast from 1,230 deg. C. into mould dusted with flour;* (×10).

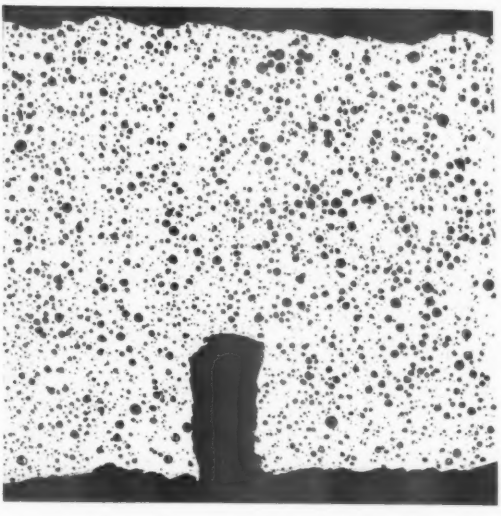


FIG. 6.—*Cross-section through brass strip cast from 1,180 deg. C. into a mould dusted with flour;* (×10).

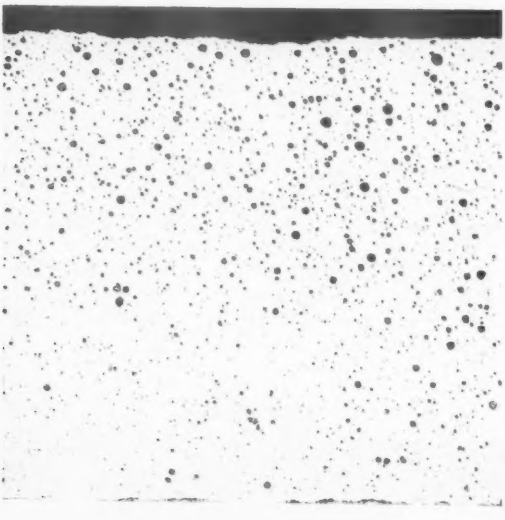
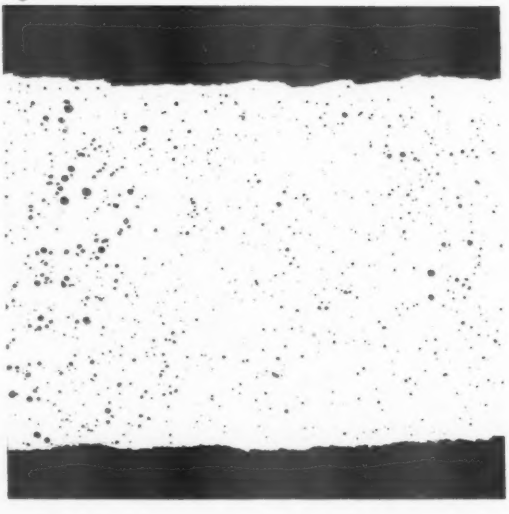


FIG. 7.—*Cross-section through brass strip cast from 1,130 deg. C. into a mould dusted with flour;* (×10).



nitrogen and pouring began between 1,260 and 1,270 deg. C.

The results of density determinations on the bars 1-in. dia. and the test-strips, and of examination of the buffed cope faces of the latter are given in Table IV and Figs. 8 to 11. Figs. 12 and 13 show two sections through test strips, confirming the degree of pinholing seen on the cope faces.

The results show that, as with the brass, the presence of wheat flour is a major factor in determining the amount of pinholing in the leaded gunmetal (*c.f.* Figs. 9 and 10) and that pinholes are suppressed by spraying the mould with aluminium/magnesium paint (Figs. 11 and 12). The amount of porosity in the lead-free gunmetal varied with the type of mould coating in the same sense as

FIG. 8.—*Buffed face of a low-phosphorus* 85/5/5/5 *gunmetal strip from a flour-dusted mould;* (×8).

FIG. 9.—*Buffed face of a high-phosphorus* 85/5/5/5 *gunmetal strip from a flour-dusted mould* (×8).

FIG. 10.—*Buffed face of a high-phosphorus* 85/5/5/5 *gunmetal strip from a plain sand mould* (×8).

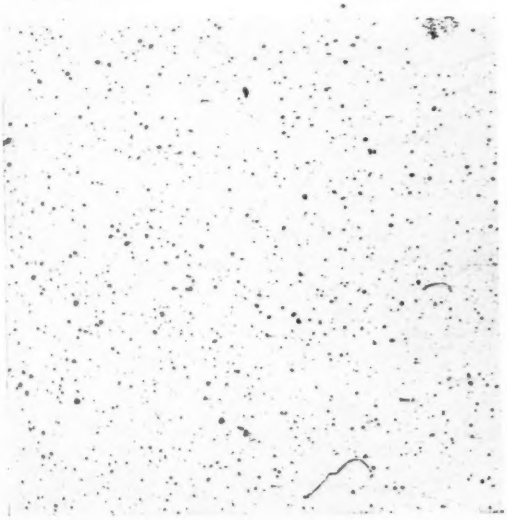


FIG. 11.—*Buffed face of a high-phosphorus* 85/5/5/5 *gunmetal strip from a mould sprayed with aluminium/magnesium paint* (×8).

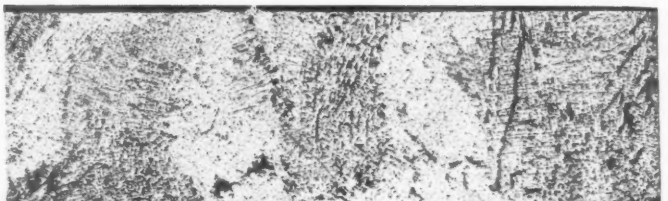


FIG. 12.—*Cross-section through a high-phosphorus 85/5/5/5 gunmetal strip from a mould sprayed with aluminium / magnesium paint, showing absence of pinholes; etched (×9).*

that in the leaded gunmetal, though the changes were relatively small and no pinholes were seen in any of the test strips made from the lead-free gunmetal.

Phosphorus contents of the order of 0.08 per cent., which at the high pouring temperatures used are known to cause marked metal/mould reaction, caused an increase in the amount of pinholing detected in the tests reported (see Figs. 8 and 9). The cross-section of a strip shown in Fig. 13 illustrates the way in which the pinhole porosity tends to segregate towards the top of the castings. Under the conditions used in these tests, metal/mould reaction is vigorous and much gas is absorbed. As the temperature falls after casting, and, with it, the gas solubility, gas is rejected as small bubbles. It appears that there is time for these bubbles to rise towards the surface before being trapped by solidification of the casting so that pinholing is more prevalent near the cope face. Gas released in the later stages of solidification will appear in the commoner form of inter-dendritic porosity. It was noticed during the experiments that pinholing was most marked in the middle of the polished face of the test-strip, *i.e.*, the hottest part of the mould. This suggests either that gas dissolved at various parts of the mould surface had sufficient time to allow the normal diffusion laws to have an effect, the gas concentrating in the hotter regions, or possibly that more gas was absorbed here before cooling and rejection of gas began.

TABLE IV.—*Pinholing in Gunmetals.*

Nominal composition Cu/Sn/Zn/Pb/P.	Mould.	Test-strips.		Bars 1 in. dia. porosity, per cent.
		Appearance.	Porosity, per cent.	
85/5/5/5/0.02 Leaded gunmetal	Plain	II	2.8	1.8
	Dusted with wheat flour	IV	3.6	4.4
	Sprayed with Al/Mg paint	I	1.2	0.1
85/5/5/5/0.08 Leaded gunmetal	Plain	IV	6.3	5.0
	Dusted with wheat flour	V	10.4	5.8
	Sprayed with Al/Mg paint	I	2.2	0.9
87/9/4/0/0.02 Lead-free gunmetal	Plain	I	1.3	0.4
	Dusted with wheat flour	I	1.4	1.8
	Sprayed with Al/Mg paint	I	0.3	0.2
87/9/4/0/0.08 Lead-free gunmetal	Plain	I	1.7	0.2
	Dusted with wheat flour	I	1.9	0.6
	Sprayed with Al/Mg paint	I	0.9	0.1

Alternatives to Wheat Flour

Although the tests reported had shown that pinholing could be reduced by dispensing with wheat flour in the mould, or be prevented by spraying the moulds with aluminium/magnesium paint, these practices produced castings with inferior surfaces. Tests were made, therefore, using various mould treatments to see whether a good surface could be obtained without re-introducing pinholing. The tests were done with brass of the same composition and using a similar procedure to that already described. Pouring began from 1,260 to 1,300 deg. C. and most melts were degassed with nitrogen. Normally, melts were duplicated and the moulds for the second melt were then poured in the reverse order, so that the effect of the fall in metal temperature during pouring could be assessed; additional D.T.D. bars 1-in. dia. were cast, with mould treatments corresponding to the strip castings. The effect on pinholing of the various mould treatments tried is shown in Table V.

While many of the treatments gave no pinholes when the pouring temperature had dropped below about 1,240 deg. C., the only ones apart from aluminium/magnesium paint which seemed to offer immunity at higher temperatures, were one of the four additions made to the facing sand and three of the 12 mould coatings tested. The successful addition was that of 1 to 2½ per cent. pelleted pitch and the promising coatings were a proprietary product (given the reference X6 in Table VI), a water-soluble urea-formaldehyde resin (X7) and a sodium-silicate/water dressing. After application of the first of these coatings, a light is applied and the coating then burns and dries out in its own heat. The other two coatings require, respectively, a curing and a drying treatment in an oven or by torch. Of the four promising treatments, the X6 coating and the incorporation of pelleted pitch in the sand appeared to give the best surface finish.

While the tests were in progress, a paper was

TABLE V.—*Effect of Various Mould Treatments on Pinholing in Brass.*

Mould treatment.	Test-strip. Appearance.	Test-strip. Porosity per cent..	1-in. bar porosity, per cent..
Incorporated in moulding sand—			
1 per cent. wood-flour	III	6.4	7.1
2 per cent. wood-shavings	IV II	6.7 1.3	8.1 1.6
2 per cent. coal-dust	II	4.9	6.7
5 per cent. coal-dust	IV IV	4.8 18.3(F)	—
3 per cent. fuel-oil	I IV	1.0 9.6	—
5 per cent. fuel-oil	II	3.6	4.9
1 per cent pelleted pitch (proprietary XI)	I	1.6	1.5
2½ per cent. pelleted pitch (proprietary XI)	I	2.9	3.2
Painted or dusted on mould—			
Al/Mg paint	I I	1.9 2.1	0.4 1.2
Sodium-silicate/water	I I I	1.3 1.8 7.2**	1.1 1.8 4.6
U.F. resin (proprietary X2)/water	I I	2.5 2.8	4.4 4.0
Alcohol/clay/graphite (proprietary X3)†	III I II	7.1 1.2 2.9	8.7 2.6 5.3
Talc(?)/clay/water (proprietary X4)†	I II III	4.0 3.8 6.0	— 4.6 6.8
Talc(?)/graphite/clay/water (proprietary X5)†	IV I I	8.5 2.1 6.3**	4.9 2.3 9.8
Talc(?)/organic binder/water (proprietary X6)†	V I IV	8.0 6.0 16.8	5.6 8.2 15.5
Silica-flour/resin/alcohol (proprietary X7)†	I I	2.7 1.6	2.9 0.9
Oil/graphite (proprietary X8)†	I IV	1.6 5.3	1.5 5.5
Talc(?) powder (proprietary X9)†	I	1.8	2.9
Pelleted pitch (10 parts)/plumbago (10 parts)/bentonite (1 part)/water	II III	2.6 4.3	— —
Ditto, but used on gating system as well as on mould cavity	I IV	1.6 8.0	1.9 5.1

† Description based on trade literature, appearance, and behaviour only.
F High porosity due to some blowing from mould.
** Macrosections explained the discrepancy between the porosity figures and the appearance of these castings. The porosity was present as centreline or marked interdendritic shrinkage and not as pinholes.

published in America[7] describing the elimination of pinholes in gunmetal by the incorporation of pitch in either the moulding sand or in a mould coating. The present experiments failed to confirm the value of such material in a coating, but, with this additional evidence to support the value of pitch in the moulding sand, the industrial trials to be described were made.

Industrial Trials

In the first trial, five moulds for door-furniture castings were poured from one 70-lb. melt of 85/5/5/5 leaded gunmetal. The moulds and cores were made in mixes of new Bromsgrove red sand with the following additions, the cores being baked before use:—(1) None—mould sprayed with aluminium/magnesium paint; (2) 5 per cent. pelleted pitch; (3) "normal" amount of flour; mould also dusted with flour; (4) 2½ per cent. pelleted pitch; and (5) none. Each mould was similar and produced about 18 castings. These were run from three sprues, the parting line being approximately vertical during pouring.

The metal was melted in a natural-draught coke-fired furnace and deoxidized with 1 oz. of 15 per cent. phosphor-copper. Pouring for the first two moulds began at 1,170 deg. C. The metal was then returned to the furnace for a period, a further ½ oz. of phosphor-copper added and the remaining three moulds filled, the intial temperature of the metal for these being 1,200 deg. C.

The aluminium/magnesium paint gave a relatively poor surface to the castings, but the pitch-containing moulds produced a surface as good as the wheat flour and the castings from these moulds stripped very easily. The plain sand mould gave a finish intermediate between the flour or pitch and the paint. The results of density determinations and examination for pinholes are given in Table VI.

Although one or two pinholes were detected in castings from the pitch-containing moulds, the overall porosity in the castings was no more than in the castings

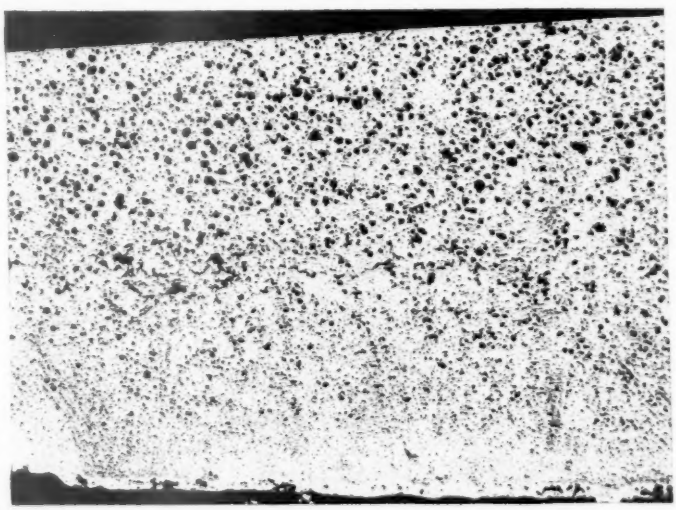


FIG. 13.—*Cross-section through a high-phosphorus 85/5/5/5 gunmetal strip from a flour-dusted mould, showing pinholing segregated towards cope face; etched (×9).*

Pinholes in Brass and Gunmetal Castings

from the mould sprayed with aluminium/magnesium paint, where the paint prevented pinholing. A little porosity was found in the castings from the plain sand mould, while the castings made by normal practice with wheat flour in the sand were markedly porous. This test was followed by

TABLE VI.—*Prevention of Pinholing in Industrial Castings.*

Mould.	Pinholes.	Porosities per cent..* Casting type.		
		1.	2.	3.
Al/Mg sprayed	None ..	2.4†	—	—
		2.2†	1.9	—
5 per cent. pitch ..	One or two ..	2.3	2.2	3.0
Flour	Many ..	5.9†	—	—
		4.2†	8.4	—
2½ per cent. pitch ..	One or two ..	2.1†	—	—
		1.9†	2.2	—
Plain sand	Few	2.9†	—	—
		2.2†	—	—

* Assuming the maximum density for 85/5/5/5 gunmetal, with 0.02 per cent. P to be 8.99 gm. per c.c.
† Two castings of the same type from one mould.

others using only 2½ per cent. and 1 per cent. pelleted pitch which were equally successful and since then a second foundry has made experiments with ½ per cent. addition of pelleted pitch and obtained castings free from pinholes and with good surfaces.

Conclusions

(1) Pinholing in brass and gunmetal castings is a form of severe metal/mould reaction, resulting from the use of wheat flour as a mould dressing or additive.

(2) The defect occurs on castings ¼-in. thick at temperatures above 1,160 deg. C.

(3) Lead-free gunmetals are for practical purposes immune from pinholing, although it can occur to a severe extent in leaded gunmetal, being increased by the presence of phosphorus.

(4) The reaction, and the consequent pinholes, may be prevented by spraying the mould with aluminium/magnesium paint, but this does not give as good a cast surface as a dusting of wheat flour.

(5) The incorporation of ½ per cent. or more pelleted pitch in the facing sand is almost equally effective in preventing the reaction. Pitch gives as good a cast surface as the wheat flour, together with ease of stripping.

(6) Protection and satisfactory surface appears to be given by several proprietary mould coatings, including a sodium-silicate/water mould dressing and a synthetic-resin/water mould dressing.

This investigation was originally undertaken as a confidential technical enquiry for two member firms and the Author's thanks are due to these firms and to the director and Council of the British Non-ferrous Metals Research Association for permission to publish the results.

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Power and Prosperity

Although the shortage of steel adversely affected the commissioning of new generating plant in 1953, which amounted to 1,413,000 kw, compared with 1,539,000 kw in 1952, the upward trend should be resumed in 1955 and rise to 1,950,000 kw in 1959. This was revealed by Lord Citrine, chairman of the British Electricity Authority, at the British Electricity Conference at Eastbourne on June 14. Consumption of electricity for the year ended March 31, 1954, was 6.9 per cent. greater than in the previous year. More than 500,000 customers were added, bringing the total to nearly 14,500,000—2,750,000 more than on April 1, 1948. Lord Citrine said that although the results for the year were not yet available, the surplus would probably be substantially greater than in previous years.

The B.E.A. is the largest single customer of coal, and Lord Citrine remarked that had the thermal efficiency in 1953 been the same as in the 12 months preceding the vesting date, an additional 4,000,000 tons of coal would have been burned at a cost of £12,000,000.

A large power station, using nuclear fission as a source of energy in addition to a station that will house 200,000-kw turbo-generator sets, each set providing nearly as much electricity as a present-day medium-sized power station, is envisaged by the B.E.A. in its recently published booklet, "Power and Prosperity." In the next decade industry is likely to double its demand for public-supply electricity, the report states, and indications are that in the long term electricity from nuclear fuel may be competitive with electricity from coal. Lord Citrine announced that close co-operation had been established by the B.E.A. with the Atomic Energy Authority, and members of the engineering and technical staff would be trained in the design, construction, and operation of nuclear power reactors for the generation of electricity. Over the next seven years over £1,400,000,000 is to be spent on increasing electricity supplies.

C.D.A. Coming-of-Age

Speaking at a luncheon held recently at Kendals Hall, Radlett, Herts, to mark the coming-of-age of the Copper Development Association, Lord McGowan, K.B.E., remarked that because he had been a friend of the C.D.A. since its inception he was well aware of how successful it had been during the past 21 years. The C.D.A. technical staff were among the best in the world for the job they had to do, and had at their fingertips, in the well organized reference library, a comprehensive system of information carefully culled from the world's leading publications on the subject. He made a plea for a closer association of science with industry, and said the Association could well congratulate itself on the work it was doing in that sphere.

Mr. R. L. Prain, O.B.E., chairman of the Council, announced the setting up of a trust fund to secure the future of the Association. The fund, which would amount to not less than £100,000, would be subscribed by the following: Roan Antelope Copper Mines, Limited, Mufulira Copper Mines, Limited, Nchanga Consolidated Copper Mines, Limited, Rhokana Corporation, Limited, and the British South Africa Company. It would be a Rhodesian trust, administered in Rhodesia by trustees representing the donors and the Association.

I.B.F. Awards, 1954

Honours Conferred on Members at the Glasgow Meeting

At the I.B.F. Council meeting held in London recently, resolutions were adopted for the following medal awards for 1954. Presentation of the awards took place at the annual general meeting of the Institute of British Foundrymen held at the rooms of the Institution of Engineers & Shipbuilders in Scotland, Elmbank Crescent, Glasgow, on June 23.

E. J. Fox Medal

On the recommendation of the assessors, Dr. J. E. Hurst and Mr. F. Scopes, the Council awarded the E. J. Fox Medal for 1954 to MR. FRANK ROWE, in recognition of his outstanding services to the foundry industry over many years.

Mr. Rowe, after leaving Manchester Grammar School, had three years' apprenticeship on the foundry floor and in the patternshops of Metropolitan-Vickers Electrical Company, Limited, before going to Manchester University to read metallurgy. After leaving the University he had varied experience in engineering, metallurgy, and foundry practice in steel, iron, and bronze before joining what is now the David Brown Corporation as chief metallurgist. During the twenty years he was with them he rose to be a director and general manager of their many foundry interests, which expanded greatly whilst he was with them. In 1943, he took up his present position of managing director of K. & L. Steelfounders & Engineers, Limited, an important member of the 600 Group of Companies. K. & L. operate one of the largest steel foundries in the British Isles, and their engineering shops are mainly devoted to the manufacture of mobile cranes. Mr. Rowe has pioneered many important developments in British foundry practice, particularly in steel and bronze founding. He has given wholeheartedly of his leisure time for many years to the furtherance of progress and efficiency in British foundry practice. He has served on many Government committees and missions connected with the industry, and is a past-chairman of the British Steel Founders' Association. He is now chairman of the B.S.F.A. productivity committee, chairman of the finance committee, and a member of Council of the British Steel Castings Research Association. He has presented numerous papers on metallurgy, foundry practice, and company administration to scientific, technical, and management bodies in this country. Mr. Rowe is a liveryman of the Worshipful Company of Founders, a freeman of the City of London, and a lifelong member of most of the technical bodies connected with metallurgy and founding in this country and the United States.

Oliver Stubbs Medal

The Institute made the 1954 award of the Oliver Stubbs Medal to MR. E. M. CURRIE, F.I.M., in recognition of his long and enthusiastic service to his fellow members of the Institute in the practice and theory of foundrywork and, in particular, of his energetic chairmanship of sub-committee T.S.35 which was responsible for the production of the film: "The Flow of Metal into Moulds." Mr. Currie, is a past-president of the London branch. He was elected to membership of the Institute in 1918, and has served on three separate branch Councils being for a short time assistant secretary to the old Coventry branch of the Institute. He began his foundry career as an apprentice moulder to Alfred Herbert, Limited, Coventry, and is at present the general manager and director of the International Meehanite Metal Company, Limited. In connection with these latter activities Mr. Currie has worked in many foundries in Belgium, France, Germany and Italy before world war II and has travelled extensively and visited foundries in America, India and South Africa. During the war he was a member of the technical advisory panel to the Directors for Iron Castings, Ministry of Supply, and was active in the development and extended uses of high-duty iron for war purposes. His very keen interest in apprentice training and welfare led to the establishment of the successful apprentice training school now operating at the Butterley Company's works, to which foundry apprentices are sent from all the Meehanite foundries in Britain. He is a Fellow of the Institution of Metallurgists and a member of the Iron and Steel Institute and of the British Standards technical committee for cast irons and serves on the Council and Literary & Awards committee of the Institute. Mr. Currie received one of the first diplomas ever issued by the Institute for his paper on "Preparation and Testing of Moulding and Core Sands" read before the Coventry branch, and since that time has contributed several other papers.

Meritorious Services Medal

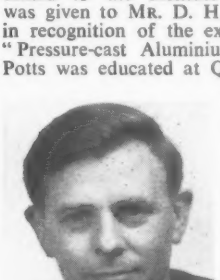
The Meritorious Services medal for 1954 was awarded to MR. WILLIAM G. MOCHRIE for the exceptional services he has rendered to the Institute as honorary secretary of the London branch since his appointment in this capacity in 1949. Mr. Mochrie was born at Bo'ness, West Lothian, in 1915, and was educated at Falkirk High School, Battersea Polytechnic and the Sir John Cass Technical Institute. In 1935 he left for London to take over a smelting-works appointment with H. B. Barnard & Sons. Three years later he joined his present employers, Tyseley Metal Works, Limited, Birmingham, as a metallurgist, later becoming an inspector and then London manager. He is the author of "A Few Non-ferrous Foundry Studies" compiled during the war years for limited circulation.

I.B.F. Awards, 1954

Mr. Mochrie has been convener and deputy-chairman of the Technical Committee of the British Bronze & Brass Ingot Manufacturers' Association since its inception in 1945. He was also a member of this Association's team which visited Germany after the war on behalf of the Ministry of Supply, and he has undertaken technical missions on his firm's behalf to Europe and U.S.A. For the past ten or eleven years, he has also served on various British Standards Institution technical committees concerned with copper-base alloys. Mr. Mochrie joined the Institute of Metals in 1940 and the Institute of British Foundrymen in 1944. He was co-opted in 1946 and elected in 1947 to the London branch Council. He had served as hon. assistant secretary for a year before being elected hon. secretary of the London branch in April, 1949, in which capacity he has served on the General Council of the Institute. Since 1949 he has been a member of the Finance Committee. His hobbies include sculpture in a very amateurish sort of way, and stopping out late at night on Institute business.

British Foundry Medal and Prize

The British Foundry Medal and prize of £10 0s. 0d., which may be awarded annually by the Council to the author of the paper adjudged to be the best presented to the Institute during the preceding year, was given to MR. D. H. POTTS of the Bristol branch in recognition of the excellence of his paper entitled "Pressure-cast Aluminium Pattern Equipment.". Mr. Potts was educated at Queen's College, Taunton, and subsequently served an engineering apprenticeship of five years with the Westinghouse Brake & Signal Company, Limited, Chippenham, spending some nine months in each section of the factory and two years in the foundry. He finished his apprenticeship just in time to be mobilized as a territorial in September, 1939. In 1946, he returned to his company and was employed as assistant to the foundry manager. He was then given further foundry training during the course of which he visited many foundries in this country and continued his studies at Bath Technical College. In 1950, he was appointed foundry engineer and later divisional (foundry) superintendent. In 1950, as a member of the Brassfoundry Productivity Team he visited America where he was given an opportunity of studying the manufacture of pattern equipment by the pressure-cast plaster process. On returning to this country, he decided to introduce the method in his own foundry and approached members of the British plaster industry who co-operated whole-heartedly in providing a suitable plaster. The method is now completely installed and practically every set-up pattern is made by this process. Since introducing the method he has presented a paper on the process to branches of the Institute in the following centres:—Bristol, London, Birmingham, Cardiff, Swansea, Bedford, Lincoln and Manchester. Many foundries have sent representatives to see his progress, including delegates from France, Belgium and Sweden.



THE ADDRESS of the Junior Institution of Engineers is now 14, Rochester Row, Westminster, London, S.W.1 (telephone: VICtoria 0786).

Tin Research Institute

The (1953) annual report of activities of the Tin Research Institute, Fraser Road, Greenford, Middlesex, states, with regard to tin/aluminium bearing alloys, that work on this group has made considerable progress and three different types of bearing have attracted interest. Samples for engine and machine trials are now being supplied on a practical scale. Solid bearings containing 30 per cent. of tin alloyed with a strong aluminium matrix have been made in the laboratory for trials in Italian tramcars. Another alloy containing 20 per cent. of tin bonded to a Duralumin backing has been in experimental use for the past 6 months on a number of automotive engines used in cars and trucks. A third alloy containing 15 per cent. tin can be bonded to steel backing shells and bearings are now being prepared for trials. The operation of these bearings and their resistance to fatigue have proved satisfactory in laboratory trials and manufacture involves no special difficulty.

The same report also deals with work on the continuous casting of bronze bars and research into improved methods of sand casting which have made progress during the year. A new alloy consisting of copper/manganese/tin has been developed out of work originally directed to meeting the shortage of nickel. The new alloy is almost white and takes a very high finish, and may be found attractive in the ornamental fields and in the electrical industry.

Dealing with tinning, studies of the formation and structure of the tin/iron alloy layer in tinplate have been continued. The structure of the alloy layer affects soldering quality; the quantity of alloy-layer, for any given amount of tin, affects corrosion resistance. An investigation of methods for determining the amount of alloy has been completed.

In the field of hot-tinning, the work has been largely confined to technical service, and 86 firms during the year have been attended. This shows a decline, almost certainly due to the spread of knowledge on this subject through the Institute's publications. On the other hand it is significant that many technical inquiries on hot-tinning are received at more-recently-established offices abroad, where much educational work remains to be done.

Time Rates of Wages and Hours of Labour

The eighth edition of "Time Rates of Wages and Hours of Labour, April 1, 1954,"* compiled by the Ministry of Labour and National Service, was published recently. The new edition shows in its main tables, for a number of industries and occupations, the minimum, or standard, time rates of wages of wage-earners as fixed by voluntary agreements made between organizations of employers and workpeople; by Joint Industrial Councils and similar bodies; or by Statutory Orders under the Wages Councils Acts, the Agricultural Wages Acts and the Catering Wages Act. Particulars are also given of the normal working hours and, where available, the basic rates for pieceworkers, the additional rates payable to shift and night workers, and, where they exist, of the arrangements for a guaranteed weekly wage. The new volume also contains, in three appendices, the rate of wages for young people in a selection of industries, overtime rates of pay and the arrangements for paid holidays in the principal industries. Changes are published regularly month by month in the Ministry of Labour Gazette.

*Obtainable from H.M. Stationery Office or through any bookseller, price 7s. 6d. net, 7s. 10d. post free.

Institute of British Foundrymen

TECHNICAL COUNCIL*

Twenty-second Annual Report

During the twelve months ended April 30, 1954, three new technical sub-committees were formed, one existing sub-committee (T.S.43) has prepared an interim report for presentation at the annual conference at Glasgow and four other sub-committees have completed or are about to complete their work. Three of these latter sub-committees have been concerned with preparing an *Atlas of Photomicrographs* of all cast metals and it is confidently anticipated that their work, when published in book form, will be regarded as a unique contribution to the study of metallography. Similarly, the interim report of sub-committee T.S.43, which will review current developments in cupola practice, is likely to be regarded as another major contribution to foundry progress.

In reviewing the past year's work, the first duty of the Technical Council is to acknowledge the immense assistance which has been drawn from many sources. Of the highest importance has been the renewal of the Joint Iron Council's grant which has done much to relieve the Technical Council of the hampering restraints of finance, with the result that such essential help as laboratory and research work at universities, the purchase of special literature, extra clerical assistance and similar services have again been placed at the disposal of the technical committees. Warmest acknowledgments are also due to the members, over 150 in number, who have taken part in the work of the Technical Council and its sub-committees and particularly to the chairmen of these committees who have spared no effort to advance the investigations with which they are concerned. Appreciation must also be expressed to Birmingham University, King's College, Newcastle (University of Durham), and University College, Cardiff, whose resources have again been extended to the Technical Council on various aspects of technical sub-committee work. It remains to thank the many firms who have not only allowed members of their staffs to attend the committee meetings, but who have permitted experiments in their laboratories and foundries. In the aggregate, this assistance has a decisive influence on the success of the work of the Technical Council.

New Work

The three new technical sub-committees formed during the year will study (i) non-ferrous surface finish, (ii) the feeding of castings, and (iii) the present position of foundry melting coke, with particular reference to the effect of coke quality upon metallurgical reactions. These subjects were recommended for investigation by the chairman's advisory panel consisting of the chairman (Mr. A. E. Peace), Mr. L. W. Bolton, Dr. A. B. Everest, and Mr. A. Tipper, after consideration of a large number of suggestions for further work which were received from branch Councils. It thus can be assumed that the problems selected are of live, practical interest to foundrymen.

Matters of common interest have continued to provide a basis for co-operation during the past year with the British Cast Iron Research Association, the British Steel Castings Research Association, the British Non-Ferrous Metals Research Association, the Light Metal Founders' Association, the Association of Bronze and Brass Founders and the technical committee of the British Bronze and Brass Ingot Manufacturers' Association, all of whom have contributed to the work of the sub-committees.

The Institute's representatives, to whom the Technical Council wishes to record its special thanks, have again been active in the work of many important external committees, including many of the committees of the British Standards Institution concerned with the foundry industry, the Joint I.B.F./B.C.I.R.A. committee on gases in cast iron and the joint sands committee.

The J. W. Gardom Student Fund scheme, with very great advantage to the participants, has continued to enable a number of students to take part in technical sub-committee work and thus to obtain a wider insight into the problems for solution which technical progress poses for the foundry industry. Doubtless, too, association with this work promotes an apprehension of the perennial stream of difficulties which arises as new advances are made and will help to fit these young men to take their part in the similar work which lies ahead.

As well as to several other organizations, sub-committee T.S. 35's film has been presented to a number of technical colleges during the past year, including the National Foundry College; the Borough Polytechnic, London; the Constantine Technical College, Middlesbrough; the School of Engineering, Burnbank; and St. Helen's Municipal Technical College. It will be noted from a later section of this report that sub-committee T.S. 35 proposes to pursue its work by the production of a further film.

It is also gratifying to record that the demand for the *Atlas of Defects in Castings* has been maintained, with the result that the printing of a new impression has been necessary. Proposals are under consideration for the preparation of a new and enlarged edition of this work.

Work in Progress

Work during the year of the active sub-committees,

* Presented at the annual general meeting of the Institute held in Glasgow on June 23.

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including that of the three newly-formed sub-committees, is summarized below:

*T.S.*24—*Ingates* (*chairman—Mr. F. J. McCulloch*):

Just before the close of the year under review, this sub-committee completed a report on its work to date, which will be considered at the next meeting of the Technical Council. The sub-committee, whose terms of reference are as follow:

"To study the influence of the shape and size of ingate and runner systems on the condition of flow of metal into a mould"

has developed formulae based on general hydraulic principles relating the rate of flow of metal in a gating system to the shape and dimensions of this system. Experimental work has shown that these formulae are sufficiently accurate for practical purposes. Further experimental work is required on step-gated castings and for gating systems involving more complex gating components, such as several branches, strainer cores, weirs, etc. In several instances of practical application of the principles outlined in this report, considerable improvement in casting quality has been achieved. The sub-committee considers that some simplification of the formulae is possible, but this will be a development which the Technical Council may decide to call upon the sub-committee to carry out in the future.

T.S. 31.—*Internal Stress* (*chairman—Mr. M. M. Hallett, M.Sc.*):

This sub-committee was formed in March, 1949, with the following terms of reference:

"To investigate the problems of internal stress in castings and to co-operate with Mr. R. A. Dodd of Birmingham University by the provision of assistance and guidance in his work on this subject."

An interim report of the sub-committee was presented and discussed at the Buxton and Sheffield conference in June, 1952. Since then, work has been completed at Birmingham University on stress in cast discs of 30-per-cent. chrome iron. This gives a qualitative picture of the stress distribution, but the design of the castings appears to have led to much lack of reproducibility in the results. Experience at King's College, Newcastle-upon-Tyne, confirms this. Reports on further work carried out at King's College on the rate of cooling of the grid test-piece provides some more evidence on the magnitude of stresses due to friction in the mould, while work at the B.C.I.R.A. has demonstrated a substantial reduction in stress in castings made in warm moulds. King's College have undertaken further work in studying the influence of the type of sand on the postulated frictional effects and will also look into the question of different designs of discs. Attention is also being given to the possibility of studying size effect by producing grid castings in two sizes of pattern, designed to suit available equipment, determining in each case the internal stresses resulting from progressive changes in the relation of the volume area ratios of the outside limbs and the central member of the grid. This will be done by altering the size of the centre member over a range in each size of grid casting.

*T.S.*35.—*Flow of Metal* (*chairman—Mr. E. M. Currie, F.I.M.*):

As previously reported, sub-committee T.S.35's film has been presented at a number of technical colleges during the past year. The Technical Council has accepted a recommendation by the sub-committee that a further film should be made which will cover the use of increased head pressure and include some types of moulds more interesting than the flat plates used in the original film. The new film is intended also to cover points of criticism that arose during the presentation of the original film.

*T.S.*37.—*Cast Iron Tests and Specifications* (*chairman—Mr. J. E. O. Little*):

This sub-committee was appointed in March, 1951, with the following terms of reference:

"To review the British Standards Institution's test specification for cast iron with special reference to: (i) the transverse test for grey iron, with particular reference to the deflection test, and (ii) the relationship of test-bar to actual casting thickness."

The sub-committee has now completed its work on the question of the relationship of test-bar to actual casting thickness and a report is being prepared which will shortly be submitted to the Technical Council. A great deal of study has also been given to the first item of the terms of reference, viz.: the transverse test for grey iron with particular reference to the deflection test, and a report on all the work carried out on this aspect is also being prepared, so that the whole position can be reviewed and a decision made as to whether or not further work is required before the sub-committee's views are submitted to the Technical Council.

T.S. 38.—*Copper-base Alloy Castings* (*chairman—Mr. F. C. Evans, F.I.M.*):

The terms of reference of this sub-committee are:

"To investigate the properties obtainable in copper-base alloy castings, having regard to the economical utilization of metals."

Following the presentation of the sub-committee's report at the Blackpool conference in June 1953 and the publication of the discussion thereon, the sub-committee has given consideration to the possibility of carrying out tests on the mechanical properties of copper-base alloys. It was apparent to the sub-committee that many difficulties and very high cost would be involved in any attempt to carry out a comprehensive programme of tests, and it was decided to appoint a panel to prepare an outline of a restricted programme of work which might provide useful information to designers. This panel has not yet made its report to the main committee.

*T.S.*39—*Mould Drying* (*chairman—Mr. W. J. Colton*):

This sub-committee was formed in March, 1951, with the following terms of reference:

"To review the factors involved in the drying and skin-drying of moulds, with special reference to the rate of removal of moisture from the mould surface."

An extensive series of tests has continued throughout the past year, particularly with the object of furnishing temperature gradients and

moisture movement. The introduction of a definite temperature control point behind the sand face being heated has resulted in more fundamental information becoming available, and at the same time permitted a visual method of determining the depth dried to be established. The results of a full-scale industrial trial, using the visual method and an alternative for assessing depths dried are expected to be available shortly. Tests to date have been mainly concerned with heating the sand face by radiant heat and the sub-committee is now turning to tests with an air-circulating oven, capable of operating at 300 deg. C., the object being to compare alternative methods of heating in relation to depth dried and rate of drying.

T.S.40—Atlas of Typical Non-ferrous Microstructures (chairman—Mr. A. Logan, F.I.M.):

As previously reported, the Technical Council decided in 1951 to proceed with a project which had been under consideration for some time to publish an *Atlas of Microstructures* covering all cast metals. To implement this decision three new sub-committees were appointed of which the first (T.S.40) has met on a number of occasions during the past year. At the end of the period under review the sub-committee had collected practically all the examples which it is desired to include in this part of the *Atlas*, and a mock-up is being prepared for early submission to the Technical Council.

T.S.41—Atlas of Typical Steel Microstructures (chairman—Mr. C. H. Kain, A.M.I.Mech.E., F.I.M.):

This sub-committee, which has been concerned with preparing the section of the *Atlas* dealing with steel has completed its work and the mock-up which will very shortly be submitted to the Technical Council is at present under review for final revision.

T.S.42—Atlas of Typical Cast-iron Microstructures (chairman—Dr. Brynmor Jones):

The section of the *Atlas* dealing with cast iron prepared by this sub-committee has been completed and submitted to the Technical Council. It has been referred by the Technical Council to an *ad hoc* panel which has been formed to co-ordinate the three sections of the *Atlas* to ensure standardized presentation when the three parts are combined in book form for publication.

T.S.43—Cupola Developments (chairman—Mr. E. S. Renshaw, F.I.M.):

Arising from the report of sub-committee T.S.36, the Technical Council in December, 1951, appointed this sub-committee with the following terms of reference:

"To investigate the hot-blast system, carburization, desulphurization, water cooling and combinations of these."

The sub-committee has now prepared a first report which has been approved by the Technical Council for presentation at the annual conference of the Institute at Glasgow in June.

T.S.44—Receivers (chairman—Mr. S. J. Sargood):

This sub-committee, which was also formed in December, 1951, and also arose from the report of sub-committee T.S.36, has the following terms of reference:

"To review the value and effect of receivers, including tapping systems and slag-handling and disposal methods."

During the year the sub-committee has collected a great deal of information on the effect of receivers on temperature and metal analysis. Other subjects which have been studied include low-frequency-induction heating, direct-arc furnaces used as holding furnaces in mechanized duplex plants, temperature losses in unheated receivers, wet slag collection, methods of measuring the depth of metal in the cupola well and the temperature at which to desulphurize. The sub-committee is preparing a review of the information now available to enable a decision to be made whether further data are required before a report is compiled for submission to the Technical Council.

T.S.45—Non-ferrous Quality Test (chairman—Mr. A. Logan, F.I.M.):

As a result of suggestions made at the Buxton and Sheffield conference, this sub-committee was formed in September, 1952, with the following terms of reference:

"To investigate the possibility of developing a suitable fracture test or other quick routine test for assessing melt quality of copper-base and aluminium-base alloys."

The sub-committee has given considerable attention to the possibility of adopting the A.F.S. fracture test, but after a good deal of experimental work the conclusion was formed that the results were too indeterminate to distinguish between normal variations in density. While the sub-committee has not entirely discarded this test, for the time being work on it has been abandoned. As far as the quality of molten gunmetal is concerned, more hopeful results have been obtained from a series of sprue tests with charcoal-covered heads. An endeavour is now being made to obtain similar results from a new series of tests with D.T.D.-bars cast with a charcoal-covered top. Preliminary results are not so satisfactory as the initial sprue tests, but are sufficiently encouraging for the work to be pursued. Tests are also being carried out with the use of materials such as plaster, having a low rate of heat abstraction, to see the effect of a low rate of solidification. A number of tests have already been carried out to assess the quality of molten aluminium alloys, but so far the results have not been encouraging. Tests using an insulating cover on the head are now being tried out but initial results again are unsatisfactory and in no way advance the sub-committee's aims. The tests will be repeated with some modifications designed to keep a suitable skin on the top while the casting is setting in the hope that a more fruitful outcome will result. The best results so far achieved for aluminium alloys have been with the vacuum solidification test, but difficulties in applying it in the foundry preclude its adoption.

T.S.46—Mould Materials (chairman—Mr. J. Hird):

This sub-committee was formed in September,

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1952, its terms of reference being:

"To investigate the effect of mould materials on the cooling rate in the solidification range of cast metals, with particular reference to cast iron."

A series of tests has been carried out at Birmingham University on behalf of the sub-committee. Preliminary work consisted of determining (i) the effect of mould variables (density, "green" state) on the solidification time of plates of different thicknesses, and (ii) the effect of ramming density on chilling power of black sand and red Bromsgrove sand in the dry and "green" state. From this preliminary work certain conclusions may be drawn for the particular mould conditions, *viz.*:

(i) The chilling power of the green-sand is greater than that of the dry-sand over the range of density investigated.

(ii) The chilling power of the sands containing coal-dust is greater than that of the original sand for green and dry states.

(iii) The increase in chilling power brought about by the presence of moisture and of a carbon addition is not as pronounced at higher densities as it is at low ones.

(iv) These chilling power relationships appear to be obeyed for the three plate thicknesses used, namely, ½, 1 and 1½-in.

The sub-committee has a further series of tests in progress at the University and it is hoped that the work will be completed and a report submitted during the coming year.

T.S.47—Foundry Coke (chairman—Mr. D. Fleming):

This sub-committee was formed in July, 1953, with with following terms of reference:

"To review the present position of the quality of foundry melting coke and to prepare recommendations concerning coke specification and practical tests, including mechanical tests."

The sub-committee held its first meeting towards the end of the year and has made a general review of the field to be investigated. It has been agreed that tests on the melting performance of various cokes in the cupola under controlled conditions will probably have to be undertaken, and it is expected that these tests will be carried out within the resources available to the sub-committee. To avoid any duplication of work already carried out by other investigators, a review of existing literature has been undertaken.

T.S.48.—Non-ferrous Surface Finish (chairman—Mr. R. W. Ruddle, M.A., A.I.M.):

This sub-committee was formed in July, 1953, the terms of reference being:

"To investigate factors affecting the surface finish of sand-cast non-ferrous castings."

The sub-committee has already carried out a series of tests using a technique by which inserts of various sands under investigation are inserted into holes trepanned out of the moulds and as a result of these experiments a plate casting has been selected for further work. The sub-committee has also prepared a set of standards for assessing surface finish. Work is now proceeding on an examination of the most-commonly-used sands in non-ferrous casting practice to enable a guide for foundrymen to be prepared, giving an order of surface finish to be expected from these sands.

T.S.49.—Feeding of Castings (chairman—Mr. H. G. Hall, F.I.M.):

Also formed in July, 1953, this sub-committee has the following terms of reference:

"To investigate methods of improving the feeding of castings with special reference to increased yield per unit weight of material melted, with due regard to overall economy."

Abstracts of published literature on the subject are being prepared with a view to collating this information with practical data in the possession of various members of the sub-committee. When this correlation is completed the sub-committee hopes to be in a position to decide what practical work should be carried out to meet the terms of reference.

Election of Chairman and Vice-chairman, 1954/55

At the March meeting of the Technical Council, Mr. A. E. Peace was unanimously nominated for re-election as chairman for the year 1954/55. At the same meeting it was reported that the vice-chairman, Dr. A. B. Everest, owing to the increasingly heavy duties he is having to undertake in another sphere of the Institute's work, would be unable to stand again for nomination as vice-chairman. Dr. Everest's decision was received with unanimous regret and with an expression of appreciation of his past services to the work of the Technical Council, a tribute which was specially emphasised by the chairman, who acknowledged the great personal help Dr. Everest had been to him during his terms of office.

Mr. J. McPheat was nominated to replace Dr. Everest as vice-chairman and this nomination, together with that of Mr. A. E. Peace as chairman, was unanimously approved and adopted at the meeting of the Council held on April 10, 1954.

The Report is signed by Mr. A. E. PEACE.

£800 Compensation to Moulder

John Paterson, an iron moulder, has been awarded £800 in Falkirk Sheriff Court in compensation for injuries received on February 16, 1953, while in the employment of the Dorrator Iron Company, Limited. He averred that while he was carrying a heavy core along a passage way, he stepped on an iron bar, which slipped from under him, causing him to fall heavily. He maintained that the bar had been carelessly and negligently flung on to the pile of iron bars in the passage way. As a result of his injuries—a strained back—he was off work for five weeks. He returned, but later suffered a relapse, as a result of which he is still incapacitated and off work. The defenders explained that the incapacity from which he is suffering is due to a functional overlay which affects the spine of moulders in general—commonly known as "moulder's back." Paterson sued the company for £1,750, but the jury awarded him £1,000, which was reduced by 20 per cent. for his own contributing negligence.

News in Brief

MORE THAN 50,000 visitors from 60 countries attended the fourth Mechanical Handling Exhibition.

EXTENSIONS to the £16,000 ablutions centre at the works of Leys Malleable Castings Company, Limited, Derby, have now been completed.

AS FROM August 1, the address of the International Meehanite Metal Company, Limited will be Meerion House, 4 Downside, Epsom, Surrey.

LORD PIERCY has been elected president of the Royal Statistical Society for the ensuing year, in succession to Sir Ronald Fisher, who retires on completion of his term of office.

MR. G. H. BUCKLEY, general foundries manager of Stanton Ironworks Company, Limited, opened the first annual sport day for children of employees of the New Works Foundry, at the Stanton Works Ground, Ilkeston.

THE FOUNDATION STONE of a new technical college at Ashington (Northumberland) was laid by Sir Walter Drummond recently. The first part of the College, comprising the workshop block and three storeys of the main building, will be completed by the end of 1955.

HOLROYD & HALL, engineers and foundry pattern-makers, of Beehive Works, Edderthorpe Street, Leeds Road, Bradford, 3, announce that Mr. George Jowett, a partner in the firm, retired on March 31, from which date Mr. Eric Shepherd continued to carry on the business as sole proprietor.

THERE are now three main lines of production at the works of Tilling-Stevens, Limited, mechanical, electrical, and traction engineers, of Maidstone. The first is for transmission units, the second is reconditioned engines, and the third, which the company has recently commenced, the production of a new Diesel engine.

DUNDEE TOWN PLANNING COMMITTEE have decided to visit Downfield Foundry of Whyte & Edward (Metals), Limited, who are considering extending their premises. The firm may amalgamate with a firm from the West of Scotland, and introduce the manufacture of light-alloy die-castings, which are at present not produced in Dundee.

ON JUNE 24, employees at the Newport, Mon. factory of Monsanto Chemicals, Limited, completed two million man/hours of work without a single lost-time accident. The factory, which employs approximately 1,000 men and women on the production of industrial chemicals and plastics, commenced its as yet unbroken accident-free run on July 10, 1953.

MR. ARNOLD CLARK, 48-year-old former fitter's labourer, was presented with the £11,000 cheque on June 24, the damages awarded to him for injuries resulting from an accident in the English Steel Corporation's works at Grimesthorpe, Sheffield, in April, 1952. A steel pan falling from an overhead crane fractured his skull and ribs and caused other injuries.

ABANDONED MINE WORKINGS under the side of Sheffield's new £1,000,000 College of Technology in Pond Street have been revealed by tests, states the report of the Sheffield City Architect. These will come under the foundations and increases the risk of subsidence. The education sub-committee has recommended that the workings be filled in at an estimated cost to the Corporation of £7,954.

A 61-FT. BARGE, formerly used for carrying steel in the Birmingham area, has been bought for £35 by the North-East Midlands branch of the Inland Waterways Association for use as floating headquarters. It is to berth in the Canal Wharf, Sheffield, where it will be converted, with the construction of a meeting room, and the installation of an engine, enabling it to travel to different places for meetings.

THE RIGHT HON. the Earl of Halsbury, managing director of the National Research Development Corporation since 1949, will open the Production Conference at Olympia on July 7 at 3.30 p.m. by presenting the 1954 Sir Alfred Herbert Paper: "Some Problems of Higher Technological Education." Admission will be by ticket only, obtainable on application to the secretary, Institution of Production Engineers, 10, Chesterfield Street, London, W.1.

THE UNITED STEEL COMPANIES, LIMITED, acting on behalf of the British Makers of Permanent Way Materials, have signed a contract with the Seven Year Plan Organization in Persia for permanent way materials to the value of £5 million. The contract calls for the delivery over three years of 100,000 tons of rails and 4,000 tons of fishplates, together with fishbolts, washers and turnouts; and is the largest single order of its type secured by British makers since the war.

DERITEND PRECISION CASTINGS, LIMITED, of Birmingham, opened a new, larger factory at Droitwich on June 23. It was decided to build new premises at Droitwich where the Borough Council has embarked on a programme of industrial development for the town. The new factory employs 103 personnel. Production will be concentrated on components for a varied range of parts for aircraft, sewing machines, guns, calculating machines and artificial limbs.

THANKS to the great iron-ore and hydro-electric development schemes in Quebec and British Columbia, there was still a promising market in Canada for British capital goods, said Mr. Peter Thorneycroft, President of the Board of Trade, on his return from a three-week tour of Canadian industrial and commercial centres. British industries were very well represented at the Ottawa Fair, he said. In general our prices were competitive, but we faced heavy competition from Germany and Japan.

THE FRASER & CHALMERS ENGINEERING WORKS of the General Electric Company, Limited, has received a contract from the Anglo-American Corporation of South Africa to supply the mechanical parts for a 10-ft. dia. double-drum winder for the Vaal Reefs Exploration & Mining Company, Limited. The unit is designed to wind six short tons at a maximum rope speed of 2,500 ft. per min. The mechanical parts, with the exception of gears and specialized items, will be manufactured in South Africa from drawings and design data supplied by Fraser & Chalmers.

CUXSON, GERRARD & COMPANY, LIMITED, Fountain Lane, Oldbury, Birmingham, announce that they have developed and placed on the market effervescent salt tablets for the prevention of the risk of "Fireman's cramp," as the salt which is lost in perspiration from the body is replaced from the beverage. The tablets contain salt in an effervescent pleasantly flavoured base and two or three are quickly soluble in half pint of water to produce a pleasant beverage in which the taste of salt is fully covered and may be taken freely and copiously.

THE FEDERATION OF BRITISH INDUSTRIES announce that a British trade fair and exhibition will be held at Copenhagen from September 29 to October 16, 1955. Her Majesty the Queen and His Majesty the King of Denmark have graciously agreed to grant their patronage to the exhibition, which will also have the full support of the British and Danish Governments. Like the highly successful British exhibitions in 1932 and 1948, the last of which attracted over a

News in Brief

million visitors, it will be organized by the British Import Union of Denmark in collaboration with the Federation of British Industries.

BECAUSE many potential keymen are drawn from technical colleges, industry should be allowed to play a more prominent part in education and should be represented on education committees, Mr. J. C. Holdship, works director of British Typewriters, Limited, West Bromwich, told the West Bromwich, Smethwick and District Manufacturers' Association in his presidential address on June 23. He stressed the need for training in salesmanship. Mr. Holdship also urged that if export trade was to be maintained and the present standard of living continued, improvement in many British factories was vitally necessary. He added that some greater measure of relief should be available to help manufacturers keep pace with foreign competitors.

AT THE INQUEST on Lawrence Bunting, chief caster at Sheepbridge Engineering, Limited, Chesterfield, who died following burns from molten metal in a foundry accident, A. E. Grocott, foundry superintendent, said he was in charge of a casting operation. He examined the mould in which the cast was being made and found a fault which was repaired, but he had jumped down to floor level when the accident took place. When he examined the mould afterwards he found that two cramps, which were definitely in position before the accident, were missing. The splash had been caused by the two cramps giving way. The coroner, Mr. Michael Swanwick, told the jury, "There has been no breach of regulations, and you will be pleased to learn that additional precautions are to be taken to reinforce the moulds and ensure a similar accident does not occur again." A verdict of "Accidental Death" was returned.

Personal

MR. J. R. PARK for twenty years works metallurgist to Bradley and Foster, Limited, Darlaston, is retiring, but will remain actively associated with the company in a consultative capacity.

MR. F. D. TAYLOR has been appointed assistant chief hydraulics engineer to Short Bros., aircraft manufacturers, of Belfast. He was formerly with British Messier, of Gloucester, where he held the position of chief draughtsman and junior executive.

MR. W. CUSWORTH has been appointed a director of Buckley & Taylor, Limited, and Mr. R. Ivor Slater has been appointed a director of Moorwoods, Limited. Both companies are subsidiaries of Brightside Foundry and Engineering. Mr. Cusworth and Mr. Slater take up their appointments from to-day.

MR. J. M. S. RISK has been appointed controller of accounts of the Brush Group, Limited, and a director of Associated British Oil Engines, Limited. He takes up his new appointment to-day, and succeeds MR. MAURICE TATTERSFIELD, now deputy managing director of Brush Electrical Engineering Company, Limited, of Loughborough.

MR. M. N. BOYDE, previously publicity manager at Foundry Services, Limited, has now joined Polygram Casting Company, Limited, as sales manager covering the sale of Polygram shell-moulding machines and equipment. Mr. Boyde has been a member of the Institute of British Foundrymen since 1950 and is an associate member of the Incorporated Sales Managers' Association.

Another Scrap Price Allegation

At Sheffield on June 25, Walker Wright & Company, Limited, Ross Street, Darnall, Sheffield, and P. & C. Garnett, Limited, Wharfe Works, Cleckheaton, were charged with dealing in scrap iron above the controlled price. The former were alleged to have sold a total of 209 tons at an overcharge of £352 18s. 9d. covering 31 offences, and the latter to have bought it. The alleged offences took place between July, 1952, and June, 1953. Both companies were committed for trial at the Quarter Sessions. They pleaded "Not Guilty" and reserved their defences.

Mr. T. E. Dale, prosecuting, said the Cleckheaton company's books were examined by an inspector and it was evident there had been overcharges paid for scrap from the Darnall firm. In a statement, Mr. L. Brearley, joint managing director of P. & C. Garnett, Limited, said they were short of scrap and were doing a large export trade, and making castings for another firm with a large export trade. The scrap which they could get from the Sheffield firm would have to be fetched from Hull and could be obtained only if haulage from Hull were paid. Mr. Dale said it was illegal to make any charge for transport or haulage of scrap. That was taken account of in the controlled price. 30s. a ton was paid for haulage and there was a slight overcharge of a shilling or two a ton over that.

The transaction was confirmed when Mr. John William Wright, of Walker Wright, Limited, was seen, added Mr. Dale. Mr. Wright had said that his firm were only doing Garnetts a favour. They did not ask for the order for that at all. His firm could only supply if they paid haulage. Mr. Dale said there was no suggestion that the transactions were not under licence. All relevant documents had been produced willingly by both companies and there had been no attempt to hide anything.

Compensation for Moulder

While Mr. J. G. Carroll, of Stenhousemuir, was in the act of pouring molten metal into a mould, the metal burst out of one of the boxes and burned his right foot severely. The accident occurred on November 12, 1951, while Carroll was employed as an iron moulder with the Grahamston Iron Company, Limited, Falkirk.

As a result of the accident, he was off work from November 15, 1951, until February 11, 1952. His average weekly wage prior to the accident was £9 10s., and during the period he was absent from work he received £19 10s. industrial injury benefit.

Carroll, who claimed that his injury was caused by the negligence of the company in supplying him with a defective casting box, sued the company for £275 damages at Falkirk Sheriff Court. In an interlocutor, Sheriff John Macgregor, Q.C., awarded him £189 damages, plus expenses.

Data Sheet

Alar, Limited, of 3, Albermarle Street, London, W.1, have just issued a data sheet covering ALAR 21—an aluminium/silicon/copper/zinc alloy. Set out are the chemical composition; mechanical properties; strength at elevated temperatures; physical properties, machinability and corrosion resistance. This data sheet is available to readers on writing to Albermarle Street.

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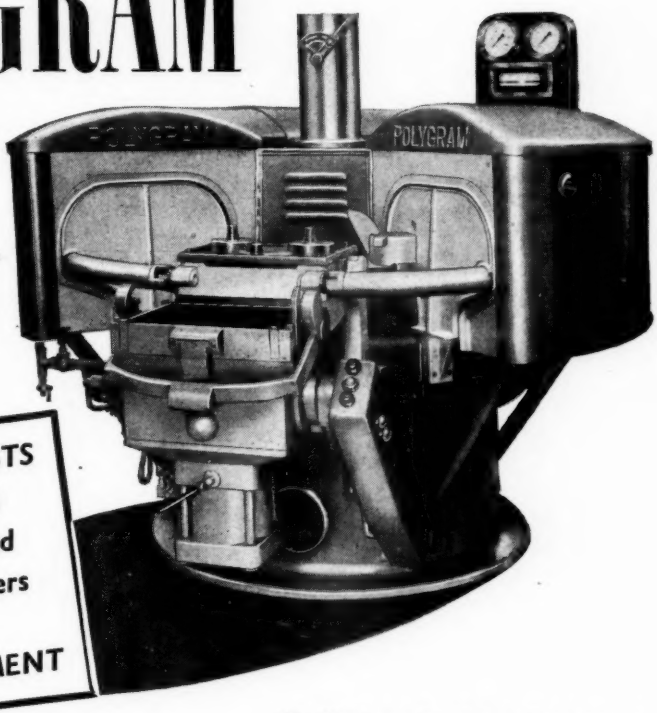
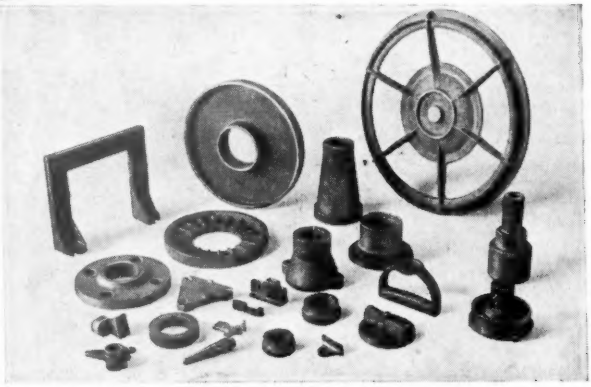


REDUCE YOUR COSTS WITH POLYGRAM SHELL MOULD and SHELL CORE Makers and AUXILIARY EQUIPMENT



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POLYGRAM CASTING CO. LTD

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Polygram FOR SHELL MOULDING

Raw Material Markets

Iron and Steel

Orders for castings have not maintained the improvement recorded in the early part of the year. Some foundries remain busy, but others are in search of orders.

On the whole, the demand for builders' castings is fairly good, and some of the jobbing foundries are able to obtain reasonable outputs. The requirements of high-phosphorus pig-iron for these foundries are being met, and although outputs have been reduced by the blowing out recently of a furnace in the north Derbyshire area for relining, this has not so far resulted in reduced deliveries.

The engineering and speciality foundries continue to be fairly well employed. The production records which are being obtained by the British motor industry call for a proportionate quantity of castings and provide good support for the foundries associated with the car manufacturers, while the machine-tool, heavy electrical, and power-plant equipment makers, collieries, steelworks, etc., continue to provide good support. The engineering foundries are using all the low- and medium-phosphorus iron they can obtain, as well as hematite and, to a lesser degree, refined iron.

Scrap supplies available for the foundries are sufficient for current requirements. Foundry and furnace cokes are coming forward satisfactorily and ganister, limestone, and firebricks are received to requirements.

Many of the re-rollers of small steel bars and light sections are employed on a better scale. Home orders have maintained the improvement and more export business has been received. The demand for heavy joists and sections has fallen slightly, but so far this has not affected the delivery position to any extent. Plates are still very much in demand, and buyers are eager to acquire supplies of black and galvanized sheets.

Non-ferrous Metals

The British Bureau of Non-ferrous Metal Statistics has published details of consumption, etc., for the month of April which suggest that while activity in non-ferrous metals is, on the whole, well maintained, the influence of the Easter holiday operated to bring the April figures below March. In copper, for example, United Kingdom usage of all grades, including scrap, totalled 42,480 tons, whereas in the preceding month the total was 48,607 tons. The proportion of scrap used in April was 12,284 tons, about 1,000 tons up on March, although the total consumption was fully 6,000 tons down. Stocks increased to 60,118 tons at April 30 from 47,258 tons at the end of March. In zinc there was a stock reduction of 1,757 tons at April 30 to 38,953 tons, while consumption, all grades, also fell by nearly 3,000 tons to 26,084 tons, of which about 19,100 tons were virgin zinc. In lead there was an increase in stocks of virgin from 28,312 tons to 30,005 tons, while usage, all grades, fell from 29,442 tons to 25,820 tons. Tin consumption also went down in April as compared with March, the comparable figures being 1,702 tons and 1,987 tons. Stocks increased sharply from 2,598 tons at March 31 to 4,065 tons at the end of April.

In London last week the tin market was firmer on better prospects for the Geneva tin agreement. France having at length signed, and when business ended on Friday afternoon last cash was up £12 and three months £10 10s.

The American situation in metals is looking brighter, for copper is heartened by the improving statistical position, while the zinc and lead producers are more satisfied now that stockpiling of these two metals has been officially adopted by Washington. Stability seems to be the outstanding feature at present and it looks as though price fluctuations will not be great during the ensuing weeks. Now that Chilean stocks have been brought down to more manageable levels, there is no great pressure from that quarter, although there are indications that some of the forward selling on the London market may be on account of Chilean copper. Markets last week were fairly steady, tin, as already mentioned, showing a substantial rise, but zinc looked rather sorry for itself, losing £1 7s. 6d. for June and for second half September £1 2s. 6d. Lead was 10s. better for June and unchanged for September, while copper was unchanged for cash and 10s. down for three months. The backwardation has widened to £2 and may get wider yet during the coming weeks.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* June 24, £239 5s. to £239 10s.; June 25, £239 to £239 5s.; June 28, £238 15s. to £239; June 29, £238 15s. to £239; June 30, £239 5s. to £239 15s.

Three Months: June 24, £237 5s. to £237 10s.; June 25, £237 to £237 2s. 6d.: June 28, £236 15s. to £237; June 29, £236 15s. to £237; June 30, £237 to £237 5s.

TIN, Standard—*Cash:* June 24, £735 10s. to £736; June 25, £735 to £737; June 28, £744 to £745; June 29, £748 to £750; June 30, £752 10s. to £753 10s.

Three Months: June 24, £734 to £735; June 25, £733 to £734; June 28, £742 to £742 10s.; June 29, £745 to £746; June 30, £747 to £747 10s.

ZINC—*June:* June 24, £78 15s. to £78 17s. 6d.; June 25, £78 12s. 6d. to £78 17s. 6d.; June 28, £77 15s. to £78; June 29, £78 to £78 5s. *July:* June 30, £78 5s. to £78 7s. 6d.

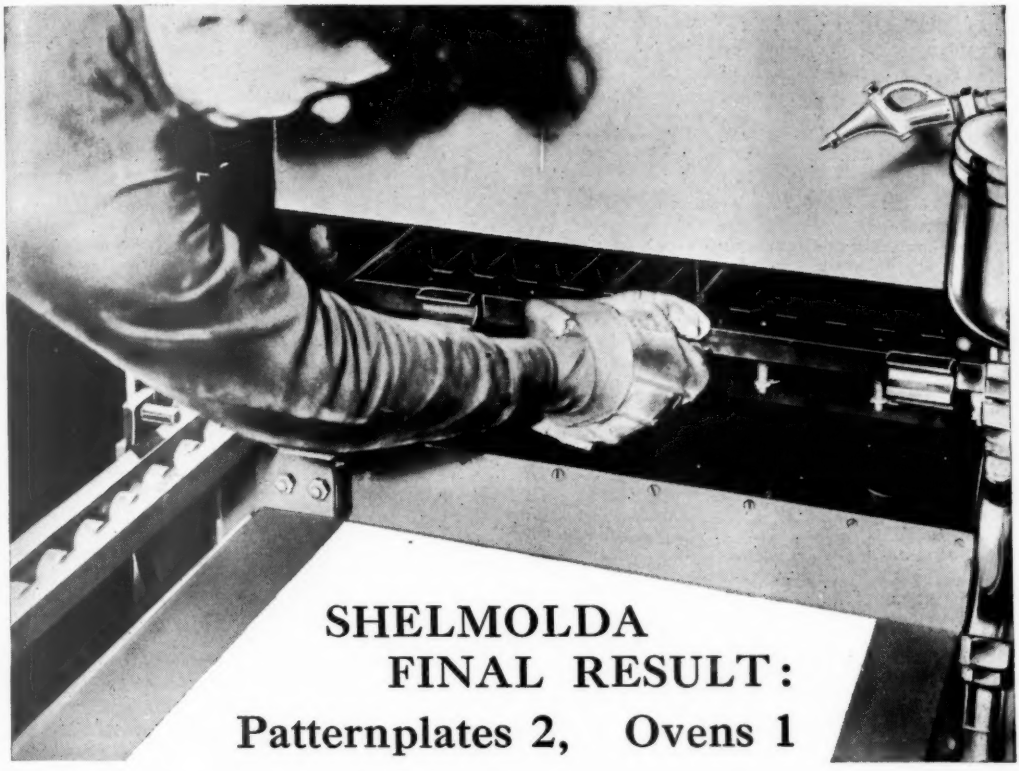
Second half September: June 24, £79 7s. 6d. to £79 10s.; June 25, £79 7s. 6d. to £79 10s.; June 28, £78 17s. 6d. to £79; June 29, £79 to £79 5s. *First half October:* June 30, £79 2s. 6d. to £79 5s.

LEAD—*Second half June:* June 24, £96 15s. to £97; June 25, £97 to £97 5s.; June 28, £97 5s. to £97 15s.; June 29, £97 10s. to £98. *First half July:* June 30, £97 10s. to £98.

Second half September: June 24, £94 10s. to £95; June 25, £94 15s. to £95; June 28, £95 to £95 5s.; June 29, £95 to £95 5s. *First half October:* June 30, £94 15s. to £95 5s.

Midland Employment

Mr. Barry Kay, regional controller for the Board of Trade and Ministry of Supply described production in the Midlands as "humming along on a good steady tone both for home and export", after a meeting of the Midland Regional Board for Industry in Birmingham last month. It was reported to the Board that 45 firms in the Midlands applied to the Board of Trade for development certificates during May to enable them to build extensions of more than 5,000 sq. ft. to their factories to meet rising production. In April, 40 similar applications were made. Unemployment in the area dropped by 11,114 last month compared with the figures for last year and it is expected that the figures for June will show still further reduction. The number of unemployed during May was 11,930, wholely unemployed and 671 temporarily without work. The May figures represented 0.6 per cent. of the total number of insured persons in the area compared with an unemployment figure of 1.4 per cent. for the country as a whole. There are 10,000 outstanding vacancies for women workers.



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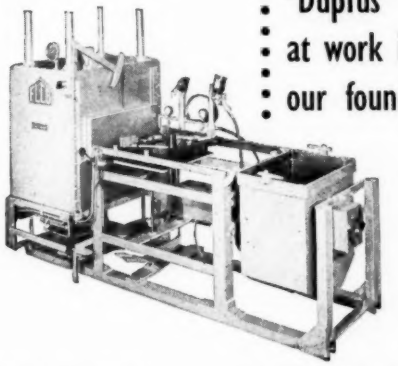
It's a winner, right enough, and here's why:

1. The single oven of the Shelmolda Duplus does the work of two. While one shell is being cured the other patternplate is being invested with a new shell.

2. The heat is applied evenly—above, below, at every side. Whatever the depth of pattern, the Shelmolda shell is cured evenly.

3. Production—can you get, anywhere, a greater output with lower running costs at anything like this price?

OUTPUT: 50/60 moulds per hour. *DELIVERY:* 8/10 weeks. *PRICE:* £575



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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

June 30, 1954

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £14 19s. 6d.; Birmingham, £14 12s. 9d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £17 5s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £17 16s. 9d.

Scotch Iron.—No. 3 foundry, £17 9s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £18 19s. 6d.; South Zone, £19 2s. 0d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £19 19s. 6d.; South Zone, £20 2s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £17 14s. 6d.; Scotland (Scotch iron), £18 1s. 0d.; Sheffield, £18 19s. 0d.; Birmingham, £19 6s. 6d.; Wales (Welsh iron), £18 1s. 0d.

Basic Pig-iron.—£15 10s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots).—40/55 per cent., £50 0s. 0d., basis 45 per cent. Si, scale 21s. per unit; 70/84 per cent., £78 10s. 0d., basis 75 per cent. Si, scale 22s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 10s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £150 0s. 0d. to £165 0s. 0d. per ton; 38/40 per cent., £239 0s. 0d. to £250 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 12s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 15s. 3d. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £85 4s. 0d., basis 60 per cent. Cr, scale 28s. 3d. per unit; over 6 per cent. C, £80 17s. 0d., basis 60 per cent. Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. 0½d. per lb. Cr; max. 1 per cent. C, 2s. 1d. per lb. Cr; max. 0.15 per cent. C, 2s. 2d. per lb. Cr; max. 0.10 per cent. C, 2s. 2¼d. per lb. Cr; max. 0.06 per cent. C, 2s. 2½d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 3d. to 6s. 9d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £255 0s. 0d. to £262 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 52s. 6d. to 70s. 0d. per lb., Nb + Ta.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 12s. 6d.; tested, 0.08 to 0.25 per cent. C, £26 12s. 6d.; hard (0.41 to 0.60 per cent. C), £28 0s. 0d.; silico-manganese, £33 16s. 0d.; free-cutting, £28 16s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 12s. 0d.; silico-manganeese, £34 17s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 16s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 0s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £31 1s. 6d.; boiler plates (N.-E. Coast), £32 9s. 0d.; floor plates (N.-E. Coast), £32 10s. 6d.; sectional material, N.-E. Coast, £29 4s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £32 7s. 0d.; flats, 5 in. wide and under, £32 7s. 0d.; hoop and strip, £33 9s. 0d.; black sheets, 17/20 g., £42 1s. 0d.; galvanized corrugated sheets, 24 g., £51 8s. 6d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £53 8s. 0d.; nickel-chrome, £75 2s. 0d.; nickel-chrome-molybdenum, £84 13s. 6d.

NON-FERROUS METALS

Copper.—Cash, £239 5s. 0d. to £239 15s. 0d.; three months, £237 0s. 0d. to £237 5s. 0d.; settlement, £239 15s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 27¾d. per lb.; wire, 266s. 6d. per cwt. basis; 20 s.w.g., 297s. 0d. per cwt.

Tin.—Cash, £752 10s. 0d. to £753 10s. 0d.; three months, £747 0s. 0d. to £747 10s. 0d.; settlement, £753 10s. 0d.

Zinc.—July, £78 5s. 0d. to £78 7s. 6d.; first half October, £79 2s. 6d. to £79 5s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £108 5s. 0d.: rolled zinc (boiler plates), all English destinations, £106 0s. 0d.; zinc oxide (Red Seal), d/d buyers premises, £96 0s. 0d.

Lead (Refined Pig).—First half July, £97 10s. 0d. to £98 0s. 0d.; first half October, £94 15s. 0d. to £95 5s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 22¾d. per lb.; rods, drawn, 32½d.; sheets to 10 w.g., 259s. 3d. per cwt.; wire, 30½d.; rolled metal, 245s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £163; B6 (85/15), £208; BS249, £177.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £202; HTB2 (38 tons), £208; HTB3 (48 tons), £220.

Gunmetal.—RCH, 3/4 per cent. tin, — ; BS1400, LG2 (85/5/5/5), £198; LG3 (86/7/5/2), £206; G1 (88/10/2/½), £279; (88/10/2/1), £270.

Phosphor Bronze.—BS1400, PB1 (AID released), £288 per ton.

Phosphor Bronze Strip, etc.—Strip, 366s. 0d. per cwt.; sheets to 10 w.g., 388s. 6d. per cwt.; wire, 45½d. per lb.; rods, 39½d.; tubes, 37¾d.; chill cast bars: solids 40½d., cored 41½d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 1¾d. per lb.; round wire, 10g., in coils (10 per cent.), 3s. 7d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 6d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 6d. per lb, Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex warehouse, £95 0s. 0d. to £97 10s. Nickel, £483 0s. 0d. Aluminium, ingots, £156 0s. 0d.; aluminium bronze (BS1400), AB1, £249; AB2, £260. Solder, brazing, BS1845, 1s. 11d. lb.; granulated 2s. 2d. lb.

Obituary

THE DEATH is announced of MR. LAURENCE BUNTING of Chesterfield. He was fatally burned in an accident on June 18 in the sand foundry of Sheepbridge Equipment, Limited.

MR. W. G. CABELL, whose death occurred at the Manor House Hospital London, was deputy superintendent of the rate-fixing department, at Rolls-Royce, Limited, Derby. He was 63.

MR. LAWRENCE BUNTING, of Chatsworth Road, Chesterfield, a chief caster at Sheepbridge Engineering, Limited, Chesterfield, who was severely burned in an accident at the foundry on June 18, died in Chesterfield Royal Hospital on June 22. He was 48 years old.

MR. JOHN THOMAS BURFORD who, during 51 years with W. and T. Avery, Limited, rose from shop boy to general works manager, has died while on holiday in Austria. He retired only 2 months ago on reaching the age of 65. Mr. Burford was the third generation of his family to work with Avery's. Mr. Burford was a founder of Avery's Sports and Social Club.

Changes of Name

The following companies are among those which have recently changed their names. The new titles are given in parentheses.

SPUNCAST, LIMITED, manufacturers of centrifugal castings, etc., of 43, Cannon Street, Birmingham (Spunalloys), Limited).

HOLMUN PRECISION COMPANY, LIMITED, tool, pattern, and machinery designers, engineers, etc., of 76, Marylebone High Street, London, W.1 (Holmun Property Company, Limited).

Development in Technical Colleges

A substantial development in a few of our technical colleges to provide for selected students full-time courses at advanced level organized on a residential basis in which a full student community life could be enjoyed. was suggested by Mr. F. H. Perkins, of Imperial Chemical Industries, Limited, at the summer meeting of the Association of Technical Institutions recently. Basic scientific education was not enough, he said.

As things stood to-day, Mr. Perkins was doubtful whether sufficient industrial support would be given for important developments in the technical colleges unless there was an improvement in the calibre of the students graduating from the full-time courses, and a change in the character of courses provided by a college for those who showed potentiality for more senior posts in industry. Qualities which industry needed were to be found in character, temperament, social adaptability, broad intellectual interests, facility for clear thought and expression, power to argue a case, and, above all, a lively enquiring mind.

The Association's national advisory council submitted a report saying that Britain's position was endangered by the failure to secure the fullest possible application of science to industry, and that this failure was partly due to deficiencies in education. The council recommends that from 15 to 20 colleges should be selected and recognized as regional colleges dealing with higher technological education, which should be financed from grants based on agreed estimates covering a period of not less than three years. Of the grant the council recommends that the Government should contribute not less than 75 per cent. and the remainder be provided by the local education authority.

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LIVERPOOL, 2. 13, Rumford St., Central 1558
GLASGOW, C.2. 93, Hope Street, Central 9969

NOTICE

Replies to Box Numbers to be addressed to "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATIONS WANTED

GENERAL / FOUNDRY MANAGER desires change. Present post controlling jobbing and mechanised foundries. Practical founder, technical, commercial, sales experience, grey iron, Meehanite, non-ferrous metals. Acceptance of full responsibility, ability to get results.—Box GF596, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN (A.M.I.B.F.), keen, energetic, desires executive position with medium go-ahead company, with opportunity to invest £2,000, or start up foundry for engineering firm. South preferred.—Box F598, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order,* 1952.

FOUNDRY FOREMAN, with extensive experience mechanised production, labour control, etc., required for Malleable Foundry in Midlands. Applications should state full details of experience, qualifications and salary required.—Box FF595, FOUNDRY TRADE JOURNAL.

APPLICATIONS are invited for the position of WORKS ENGINEER. Degree or A.M.I.Mech.E. standard preferred. Experience in furnace construction and installation of all types of machinery associated with the smelting and refining of non-ferrous metals desirable. Must be capable of instituting and controlling complete works maintenance schemes. Applications will be treated in strict confidence.—Details of experience and qualifications to Box AA586, FOUNDRY TRADE JOURNAL.

REPRESENTATION required by experienced and fully trained Foundryman, to cover the Southern half of England. Thorough practical and technical knowledge of trade. Capable of working on own account. Interested in foundry supplies, metals, ferrous and non-ferrous, Machinery, and general equipment.—Box RR610, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for Malleable Iron Foundry in Home Counties. Age 33 to 45. Salary £1,000, and pension scheme. House with garage available at nominal rent.—Apply, giving full history of education, posts held, technical and managerial experience, to Box FM609, FOUNDRY TRADE JOURNAL.

ASSISTANT WORKING FOREMAN PATTERNMAKER required for progressive North-East Coast Foundry manufacturing Castings for shipbuilding, the building trade, and general Light Engineering Castings. Applicants should be accustomed to and fully conversant with the preparing of patterns for floor moulding and mechanized moulding plants. Permanent position to suitable applicant. Contributable Pension Scheme.—Applications, giving full and explicit details of previous experience and wage required, to Box AW611, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

FOUNDRY FOREMAN for Non-ferrous Foundry, employing 25 men. Jobbing and machine work. Old-established firm in Yorkshire. Contributory pension after probation.—Reply to Box FF583, FOUNDRY TRADE JOURNAL, enclosing recent medical certificate and two independent references.

FOUNDRY FOREMAN required for Whiteheart Malleable and Grey Iron Foundry in Walsall. Applicants must have had experience with repetition production and jobbing work.—Apply, giving details of experience and wages required, Box FF584, FOUNDRY TRADE JOURNAL.

SOUTH AFRICA.—Required for South Africa a SERVICE ENGINEER, widely experienced in Vitreous Enamelling, to undertake the sales and service of all types of frits. A permanent post with excellent prospects.—Write in first instance to Box SA566, FOUNDRY TRADE JOURNAL.

REPRESENTATIVE required by large Industrial Company, for Scotland and Ireland. Essential to have sound knowledge of Crucible and Refractory products. Scot preferred. State age and experience. All replies treated in confidence.—Box RR561, FOUNDRY TRADE JOURNAL.

YOUNG fully trained PATTERNMAKER with technical qualifications, required for a Staff post as Assistant Estimator in an expanding and progressive Grey Iron Foundry. Pension Scheme in operation.—Write to PRODUCTION MANAGER, Henry Wallwork & Co., Ltd., Red Bank, Manchester, 4.

METALLURGISTS and METALLURGICAL CHEMISTS required in Metallurgical Department of large foundries in S.E. London. The work consists of investigations and production control relating to the manufacture of non-ferrous metals and alloys. Salaries according to qualifications and experience.—Write, giving full particulars, to J. STONE & Co. (CHARLTON), LTD., London, S.E.7.

FOUNDRY SUPPLY MERCHANTS have an attractive opportunity vacant in London area for first-class REPRESENTATIVE, with successful technical and sales experience. Only those whose earnings have exceeded £800 should apply, with full particulars of education, training and positions held.—Box FE593, FOUNDRY TRADE JOURNAL.

APPLICATIONS invited from fully skilled NON-FERROUS SAND MOULDERS for immediate vacancy, with excellent prospects. 5-day week, canteen facilities, South Coast area, with congenial surroundings. Write full details present and previous employers, age, present salary, in confidence.—Box AI531, FOUNDRY TRADE JOURNAL.

FIRST-CLASS skilled PATTERNMAKER required. Experienced in wood and metal. Average wages of 44-hour week between £10 and £11.—Apply WELLWORTHY, LTD., Lymington, Hants.

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